Marcellus Shale:
A Citizens View

Citizens Marcellus Shale Commission

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Sponsoring Organizations:

Pennsylvania Budget and Policy Center

The Pennsylvania Budget and Policy Center is a non-partisan policy research project that provides independent, credible analysis on state tax, budget and related policy matters, with attention to the impact of current or proposed policies on working families.

Clean Water Action

Keystone Progress

League of Women Voters

The League of Women Voters, a nonpartisan political organization, encourages informed and active participation in government, works to increase understanding of major public policy issues, and influences public policy through education and advocacy.

Housing Alliance of Pennsylvania

The Housing Alliance is a statewide coalition working to provide leadership and a common voice for policies, practices, and resources to ensure that all Pennsylvanians, especially those with low incomes, have access to safe, decent and affordable homes.
We promote common-sense solutions to balance Pennsylvania's housing market and increase the supply of safe, decent homes for low-income people. www.housingalliancepa.org

PennEnvironment

Sierra Club Pennsylvania Chapter

Clear Coalition

The CLEAR Coalition is a broad-based coalition of labor organizations representing more than 1.1 million hard working Pennsylvanians. CLEAR advocates for a balanced approach to the state budget, one that makes sound public investments, provides essential services to Pennsylvanians, and includes sustainable and accountable revenue for critical government infrastructure.

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Introduction

Pennsylvania has been the site of fossil fuel extraction for over a century and a half. Its rich oil fields, coal veins, and gas wells have created great wealth for some of our citizens and communities, but often, that wealth has been fleeting and come at untold expense. Once-thriving communities declined as mines closed and jobs disappeared. What remains is longer lasting – a legacy of damage to streams, water supplies and wildlife habitats, reduced incomes, and impoverished communities.

The blessing of natural resources has brought boom times again – this time, it is the Marcellus Shale. Once again, Pennsylvania is managing a veritable gold rush. For some it could not come soon enough. For others, the legacy of Pennsylvania's coal economy is an ever-present and ominous reminder of what can and will happen without thoughtful preparation and timely intervention.

Natural gas extraction in Pennsylvania's deep shale layers requires a more industrial and more impactful process than traditional shallow well production. To manage this new boom, policymakers need to view the industry with fresh eyes and open minds.

Today, we have the luxury of looking back at one hundred years of fossil fuel extraction and asking the question: What did our forebears do wrong, and what lessons can we – must we – learn from it? This is the lens we should apply to development of the Marcellus Shale: Looking back one hundred years from now, what will our descendents see? Will our children and grandchildren puzzle over some of our choices? Or will they thank us for factoring their well-being into our present-day decisions? We can turn the benefit of hindsight into the gift of foresight and recognize that decisions made today will impact future generations.

Participating organizations were Clean Water Action Fund, PennEnvironment, the CLEAR Coalition, Pennsylvania League of Women Voters, Housing Alliance of Pennsylvania, Keystone Progress, the Pennsylvania Budget and Policy Center, and the Sierra Club. The groups nominated citizens to serve on the Commission – a group offering varied expertise, geographic diversity, and a willingness to approach the issue in an unbiased and impartial manner. Seven of the 16 Commission members come from communities with active drilling.

The Commission held five hearings across the state and invited citizens to share their experiences and opinions – positive and negative -- about natural gas drilling. Each hearing included one hour of invited testimony from Pennsylvania and national experts, and two or more hours of citizen testimony. More than 400 people from 48 counties attended the hearings. The Commission also received 100 comments on its website.

Hearings were held in:

- McDonald Township, Allegheny County: South Fayette Middle School , August 31, 2011
- Philadelphia: Free Library of Philadelphia, September 6, 2011
- Williamsport, Lycoming County : Lycoming College: September 21, 2011
- Wysox, Bradford County: Wysox Fire Hall, September 22, 2011
- Harrisburg, Dauphin County: Widener Law School, September 26, 2011

Commission members held regular conference calls from mid-August to mid-October to discuss findings, share information, and consider recommendations.

Summary of Citizen Comment

Despite the geographic dispersion of the hearings, many common themes emerged:

Citizens take their right to clean air and water very seriously. Repeatedly, citizens cited Article I, Section 27 of the Pennsylvania Constitution – the one that begins, "The people have a right to clean air, pure water, and to the preservation of the natural, scenic, historic and esthetic values of the environment." To Pennsylvanians, this right is not empty words on a page but a clear directive to policymakers.

Citizens believe that Pennsylvania has not been prepared to responsibly address the rapid expansion of this industry or the impacts of drilling. State budget cuts have left regulatory agencies inadequately staffed to handle the increased volume of activity, and local municipalities were unprepared for the rapid pace of development.

Many citizens called for a moratorium on gas drilling and several urged an outright ban.

Citizens have concrete, practical recommendations that they believe will resolve their concerns. Commission members were impressed with the level of knowledge and thoughtfulness of the vast majority of presenters. They described their experiences and suggested laws and regulations that could serve as models for Pennsylvania. They offered strategies to rectify their concerns, from compressor noise and wastewater treatment to human services, housing infrastructure and social impacts.

Citizens across the Commonwealth had different but equally valid concerns. While many of the issues raised during the hearings were similar, the impacts of drilling and the concerns raised by citizens differ from community to community across Pennsylvania:

- Southwest: Noise from compressors, danger to public water supplies from wastewater and spills, and the loss of local zoning control.

- North central: Preservation of state forests and game land, habitat disruption, and the impact of drilling and pipelines on sportsmen and the tourism industry.

- Northeast: Well contamination, truck traffic, and the loss of a cherished rural way of life.

- Southeastern and central: The potential for long-term effects to water supplies that serve the vast majority of Pennsylvania residents, and the siting of pipelines and other facilities that will be needed to transport gas to market, here in the US and abroad.

Citizens fear that policy and regulatory processes are disjoined and lack cohesion. Policy must address the cumulative impacts of drilling on air, water, open spaces, forest, forest habitats, and human and social infrastructure.

Citizens believe that elected officials have been unable, and at times unwilling, to balance the interests of industry with those of individuals and communities. Local elected officials have at times been great leaders, but citizens fear that some have too quickly dismissed their questions and concerns. Local governments don't have the staff or the resources to create or defend local zoning ordinances or take steps to protect citizens from intrusive industry practices.

Citizens believe that the tolerance for industry mistakes is too high. Even reputable companies have made errors, but the response from the Pennsylvania Department of Environmental Protection (DEP) and public officials has been tolerance rather than toughness.

Citizens believe that companies are not being held sufficiently accountable. Testimony focused on the need for real consequences for violations and poor practices. Citizens are very concerned that repeat violators are not held accountable. Many invoked the penalty provisions of RCRA, the federal Resource, Conservation, and Recovery Act, which imposes stiff penalties and jail time for CEOs of companies who violate its provisions, as a model for gas drillers.

Citizens want to know that public agencies are in their corner. Many have expressed frustration that DEP has veered from its primary mission as the protector of Pennsylvania's environment and it people. Pennsylvanians do not want their officials to partner with the industry, they want them to regulate it.

Citizens want full disclosure of risks associated with natural gas drilling. Many testifiers noted that the Securities and Exchange Commission requires publicly traded companies to provide full disclosure of risks associated with drilling activity and suggested that residents, including leaseholders and near neighbors, be given similar information.

In the Marcellus Shale, Pennsylvania has a valuable natural resource that may help to stave the ravages of an economic downturn. Statewide, we are equally blessed with the resource of citizens who have thoughtful, reasoned ideas for managing this 21st Century boom. Through the Commission and this report, they share those ideas, and their expectation for a voice in the imperative to protect the precious assets – our communities and the land, air, and water that sustain them – that make Pennsylvania great.

Four Principles Guide Good Management

Perhaps Nadia Steinzor Marcellus Regional Organizer, of Earthworks Oil & Gas Project, best summarized the voice of thoughtful caution that emerged from the testimonies of more than 120 citizens statewide. Any continued drilling, Steinzor testified in Philadelphia, should be guided by four principles:

- **No water pollution, and limited water consumption** to protect health and the environment from hazardous chemicals and preserve precious water resources.
- **Low emissions** to protect health, the environment, and the climate.
- **No-go zones** to protect sacred and sensitive natural places, drinking watersheds, agriculture, and other areas.
- **Landowner and community consent** to support the rights to negotiate with companies and to say no to energy development on one's own property.

Recommendations

General Recommendations

The Citizens Commission urges the Governor, General Assembly and the Department of Environmental Protection to immediately take the following steps to ensure all citizens their constitutional right to clean air and pure water:

End the privileged treatment of the gas industry. The policy of expedited permits should end immediately and DEP should stop issuing waivers or general permits that have the effect of circumventing or weakening environmental protections.

Raise the bar to protect the health and welfare of the citizens and the environment. The Commonwealth should improve laws and regulations (enumerated in detail in the report), provide funding necessary to ensure vigorous enforcement and significantly increase penalties on violators.

Specify and protect areas of the state that are unsuitable for natural gas development. The moratorium on gas drilling in state forests should be extended.

Fully acknowledge the risks of natural gas development. Undertake a full cumulative impact analysis of existing and likely proposed industrial development in Pennsylvania's Marcellus Shale, including an analysis of impacts on water quality and quantity, air quality, land use, habitat, and human health. As *Scientific American* (October 19, 2011) notes in an editorial addressing gas development in Wyoming, Colorado, Texas and Pennsylvania:

> "All these states are flying blind. A long list of technical questions remains unanswered about the ways the practice could contaminate drinking water, the extent to which it already has, and what the industry could do to reduce the risks." http://www.scientificamerican.com/article.cfm?id=safety-first-fracking-second

To better protect the environment and public health, the commonwealth should put in place stricter protections for air quality and surface and groundwater prior to issuing new permits.

Make industry pay its fair share. Institute a drilling tax on gas producers, and restore local governments' ability to assess the value of oil and gas reserves for tax purposes to address community impacts. Ensure proper bonding and clean-up requirements are in place for all well sites and facilities, with an escrow fund established for unintended consequences to public health and the environment.

Abandon the current piecemeal process for permitting gas drilling sites and infrastructure. Institute a comprehensive permit process at all sites, and ensure the process is transparent.

Restore Conservation Districts role in permitting and enforcement. Conservation Districts are trusted by residents to fairly and thorough review permits and apply the law.

Ensure the integrity of well casing to protect water supplies , and require continued monitoring and repair through the production process and beyond.

Monitor and minimize harmful air emissions and pollutants by requiring the use of the best technology.

Require companies to report citizen complaints to DEP.

Establish an office of consumer environmental advocate in the Office of Attorney General to provide a transparent forum in which public complaints can be heard and investigated.

Specific Recommendations

Better Control Air Emissions Emanating from Gas Production and Transmission Facilities

-The DEP should conduct baseline background monitoring in non-drilling areas as well as long-term ambient monitoring for NOx, particulates, Volatile Organic Compounds (VOCS), methane and ozone air quality at permanent stations in any area where the well and/or compressor engine density exceeds 10 wells per square mile.

-The DEP, municipal police, and Pennsylvania State Police should enforce the Diesel Powered Motor Vehicle Idling Act (35 P.S. § 4601) at all well pads, staging areas, and water withdrawal sites.

-Pennsylvania should implement best practices and best available technology immediately, (including the proposed EPA standards) and enforce them at all well sites and related production, refining, compression and transportation facilities.

-To address on-site emissions from engines and compressors Pennsylvania should prohibit uncertified (i.e., EPA Tier 0) diesel-powered drilling or hydraulic fracturing engines for any activity at the well sites. Drilling engines and drilling air compressors should be limited to EPA Tier 2 or newer equipment, equipped with diesel particulate filters. (NY mitigation measure).

-All operators should implement a program of leak detection and repair and reduced butane toluene ethyene and xylene (BTEX) emissions at storage tanks and small glycol dehydrators. (EPA proposed standard).

-All operators should enclose and install sound insulation at compressor stations; adopt mitigation procedures for startup, shutdown, and malfunction at compressor stations; and notify nearby residents of such incidents.

-DEP should aggregate all drilling, completion, production, and transmission facilities connected to any compressor station for review as a single source of air pollution.

-Open wastewater and solid waste impoundments should be prohibited and full utilization of closed-loop water and waste systems should be required.

Reduce the Potential for Wastewater Degradation of Surface Waters

-Companies involved in extraction of natural gas from all shale deposits in Pennsylvania should be required to eliminate the use of toxic chemicals in all hydraulic fracturing operations.

-All produced water (frackwater, wastewater and flowback) should be stored in closed tanks prior to offsite disposal, well pads should be impervious, and the tanks should be surrounded by secondary confinement to capture any spillage.

- Signage and placards that allow the public to differentiate freshwater trucks from flow backwater trucks must be clear and visible from a distance. Truck colors and hose colors could also vary.

-Drilling companies should be required to test, at the companies expense, all individual water supplies for chemicals and minerals typical of drilling operations within 3000 feet, similar to the requirement for coal mining, of any proposed natural gas well The tests must be completed by certified state laboratories and residents informed of the results prior to any excavation in preparation for drilling.

-Produced water that cannot be reused or injected into appropriate disposal wells must be submitted to treatment facilities capable of removing chemicals and TDS to current Chapter 95 standards before being returned to rivers and streams. If such facilities do not exist in numbers sufficient for anticipated volumes, then they must be constructed at the industry's expense.

-Re-use disposal of wastewater for dust control, de-icing or other purposes that threaten surface resources should be banned.

- Tracers and tracer dyes should be required at the wellhead to facilitate identification of the source of

water contamination and spills. The content of the tracers should be reported to the DEP and published on the website. Split water samples should be taken at all drill sites, with both DEP and the company maintaining a share of the sample, to facilitate swift identification of contamination sources.

Better Protect Property Owners from Gas Production Impacts

-Setbacks for gas producing wells should be increased to 3,000 feet from occupied structures & water sources (based on the Duke University study indicating methane migration at this distance)— with a strong recommendation of 5,000 feet to provide a margin of safety for schools, child care programs and hospitals.

-The presumed zone of contamination should be increased to 3,000 feet and this presumption should not be time limited.

-A municipality's right to enact local zoning under the municipal planning code, including siting of drilling facilities, should not be abridged.

-A municipality's receipt of revenue from any drilling tax or impact fee should not be linked to its adoption of a state zoning ordinance.

-All engines used in or on drilling equipment, construction equipment and other gas-related equipment and installations should be required to have installed Best Available Technology (BAT) mufflers.

Create Revenue Sources from Natural Gas Extraction

-Pennsylvania should enact a meaningful drilling tax at the state level that sets a rate comparable to that in West Virginia, and distributes funds primarily to impacted communities as the industry grows and declines, to preservation and enhancement of natural resources, and the monitoring and protection of public health..

-A municipality's receipt of revenue from any drilling tax or impact fee should not be linked to its adoption of a state zoning ordinance.

-The ability of local governments to assess the value of oil and gas reserves for local property tax purposes should be restored.

-Mandatory contributions by the industry to a superfund should be established to deal with unintended consequences.

-Prevent the burden on Pennsylvania taxpayers by establishing a sufficient fee structure for bonds, permits and surcharges to pay for known and unknown consequences.

Protect Public Lands and Waters of the Commonwealth

-The commonwealth should extend the current moratorium on new gas leasing in state forests, and implement a moratorium on state game lands until there an appropriate assessment of impacts of drilling.

-Require a stream analysis within 500 feet of a well pad and in the corridor of any related facility a as part of the well drilling application process to DEP. A similar analysis is already required for long-wall and strip mining permit applications.

-As other states have done, Pennsylvania must enact legislation that will not allow surface disturbance on state park lands in order to protect this critical resource.

- DCNR has established strong requirements for drilling in state lands including developing and encouraging the use of best management practices. DCNR's practices should serve as a model for drilling on non-state lands.

-The Pennsylvania Department of Conservation and Natural Resources (DCNR) should undertake an analysis of the cumulative impact of natural gas production on public lands as required under the current moratorium, taking into consideration well pad spacing, the location and number of gathering and transmission lines, roads, compressor stations and associated gas infrastructure development. The analysis should consider the impact on recreational use of public lands and the impact of drilling on the timber and tourism industries.

- DCNR has established strong requirements for drilling in state lands including developing and encouraging the use of best management practices. DCNR's practices should serve as a model for drilling on non-state lands.

-DEP must consult with the Pennsylvania Fish and Boat Commission before permitting gas well or infrastructure development in the vicinity of high quality headwaters, wild and wilderness trout streams, High Quality or Exceptional Value waters and wetlands associated with them and condition permits to minimize impact.

-The Commonwealth should specify areas where drilling is prohibited, including high quality and exceptional value streams, wetlands and floodplains.

Better Protect the Property Rights of Citizens

-The Oil and Gas Act should be revised to allow local ordinances to regulate industrial sites within their jurisdiction to protect public health, the environment and community values.

-The Oil and Gas Act should be revised to allow for the protection of the health and property of surface owners.

-A municipality's right to enact local zoning should be extended under the municipal planning code to include siting of drilling facilities.

-The Property Rights Act of 2006, which restricts the use of eminent domain should be continued without amendment.
-Natural gas pipeline companies should not be given the right to eminent domain enjoyed by regulated public utilities.

-The General Assembly should limit the number of well pads, and set minimum spacing requirements based on best available practices.

-To minimize environmental risks and promote conservation, the grouping or pooling by companies of previously leased properties should be required. Drilling for natural gas under unleased properties should be prohibited.

-Property owners leasing their mineral rights should be afforded three business days to reconsider and revoke their contract.

" Landmen" negotiating leases and contracts must obtain professional licenses similar to real estate agents.

-Companies should be required to produce a detailed drilling plan and update it on a regular basis.

The General Assembly should adopt a Property Owners' Bill of Rights.

Limit Water Withdrawals to Protect Other Uses

- The oil and gas industry should be required to disclose all sources of water used in their operations.

- The oil and gas industry will be prohibited from withdrawing water from ground and surface sources within Pennsylvania during drought and other periods when residents or other industries are subject to restricted use.

-A cumulative impact analysis or environmental study on the loss of ground water for drinking water wells, base flow of streams and other water resources needs to be completed to assess the subsurface changes that would occur and the resulting environmental impacts.

- A study should be conducted in each of the Commonwealths watersheds that provides a calculation of how much total water can be removed without degrading surface and ground water resources, affecting unique habitats or negatively impacting other water uses in the commonwealth.

-For waters of the Commonwealth not regulated by the SRBC or DRBC, the DEP should create and implement its own no less stringent water withdrawal assessments, reviews and permitting obligations.

-An Aquifer Test should be required for each gas drilling permit application.

-Fees for the withdrawal of water for consumptive permits should be set significant higher than fees for water that remains within the water cycle.

Protecting Aquifers

-Protect freshwater aquifers for their expected useful life using well sealant materials that are sufficiently advanced to ensure their durability and mechanical properties.

-Guarantee long-term maintenance of production well sealant materials with legally binding and enforceable provisions.

-Find and plug all abandoned, unplugged, and poorly plugged wells throughout the entire wellbore from the ground surface to the lowest production zone within 1,000 feet of any new well.

-Old gas and oil wells should not be used for waste disposal, through methods such as underground injection, of hydrofracking wastewater where homeowner wells or abandoned or poorly plugged production wells exist within at least 3,000 feet.

-Require all gas companies to use company-specific tracers in their frack fluid at concentrations that allow appropriately for dilution, and legally require full disclosure of all groundwater and surface water contamination information.

-Demonstrate that no hydraulic connection is present along fracture pathways between planned gas wells and homeowner wells within a radial distance of at least 3,000 feet, as determined by a 24-hour, high-yield pumping test. **Such test results should be a mandatory part of each well drilling permit application for any well planned to be drilled below the base of freshwater aquifers.**

Reduce Impacts from Pipelines and Transmission Facilities

- All new pipelines should be designed to comply with maximum safety standards regardless of where they are located. - Watershed and wetland protection plans should be developed and implemented in conjunction with DEP and watershed associations and commissions such as the DRBC and SRBC for all pipeline crossings.

-Remove loopholes that hold industry to less stringent state standards for erosion and sediment control.

-All pipeline companies should be required, at the very least, to comply with DEP Chapter 102 Erosion and Sediment Control regulations with gravel roads treated as development.

-Conservation District oversight of pipeline sediment and erosion should be restored.

-Minimum setbacks from dwellings, schools and other environmentally sensitive areas should be established for pipelines of all classifications and for compressor stations using US DOT PIPA recommendations to ensure a safety zone. Notification to all stakeholders within 2,000 feet of proposed compressors should be required.

-Irrespective of whether the sponsor is a public utility, the PUC should have the authority to regulate all pipelines, including gathering lines, for safety.
-Prior to well drilling permit approval, detailed infrastructure plans should be submitted to the PUC and to DEP which include the total number of compressor stations, gathering lines, capacity, and distance requirements of compressor stations.

-Prior to well drilling permit approval, detailed plans for gathering lines, transmission and distribution infrastructure should be submitted PA PUC and US DOT. Detailed plans should include pipeline diameter, psi, and miles of pipeline required for each classification.

-Require compressor engines testing at 100% capacity at all times with full and documented disclosure under PA Right to Know Act.

-Air quality studies should aggregate compressor station emissions rather than single station emissions, data should be collected by company and by geographic area.

- Pennsylvania should apply comparable reporting and safety regulation requirement to all pipeline infrastructure from gathering line, transmission and distribution lines and construction standards at least as strong as the most stringent neighboring states.

Better Protect Public Health

-Immediately create a health registry and data base to track illnesses in drilling communities; use pre-existing data gathered in other states where appropriate. .
Adequate funding must be supplied to the PA Department of Health to cover the costs of creating a health registry and data base.

-Industry should be required to disclose both the identities and amounts of each chemical (by common name and brand name) used in the hydraulic fracturing process to help health officials understand the likely health effects and treat exposures.

-Occupational health of shale gas workers should be monitored by the Department of Labor and Industry.

Realistically Assess the Long and Short Term Employment Impact

-The Department of Labor and Industry should undertake an analysis of the impact of Marcellus gas development on the agriculture, tourism, and timber industries. All new analysis of jobs should account for changes in employment in all of these industries and should track the jobs impact over time.

-A reliable, standard methodology should be established to track Marcellus Shale employment impact, including research on the share of jobs held by Pennsylvania and non-Pennsylvania workers. The Department of Labor and Industry should convene a group of academic researchers to develop a standard consensus protocol. New hires data should not be used to track employment changes in Marcellus gas-related industries.

-The Commonwealth should establish a program to train unemployed Pennsylvania workers for high-paid Marcellus jobs.

-Pennsylvania should create a Permanent Trust Fund that supports diversification of the economy in gas drilling communities and development of industries that can prosper after the Marcellus boom.

Enforcement of Environmental Protection Laws Must be Improved

-Amend the Oil and Gas Act to authorize jail terms for CEO's of companies and their managers who intentionally, knowingly or recklessly violate environmental laws.

- The fines recommended by the Governor's commission are too low. Fines and penalties should be sufficient to deter future violations and recover any economic benefits.

-Empower citizens to file lawsuits to remedy violations of the environmental statutes and regulations affecting gas development, and for courts to assess fines, penalties, and damages for those violations.

-Require companies to report citizen complaints to DEP.

-Establish an office of consumer environmental advocate in the Office of Attorney General to provide a transparent forum in which public complaints can be heard and investigated.

Impacts on Individuals and Communities Must Be Addressed

-enact a robust statewide drilling tax that provides resources to local governments to pay for drilling and growth related costs.

-to better preserve the rural nature of Pennsylvania communities, provide technical assistance to local governments to improve planning and land use capacity.

-support the formation of ongoing county task forces as a vehicle to further understand concerns, and solve problems identified by citizens.

-in response to the critical shortage of housing in the Marcellus Shale region, as noted in the Governor's Advisory Commission Report, a portion of any drilling fee established should be dedicated to affordable housing through direct payments to county affordable funds established under the Optional County Affordable Housing Act and to the State Housing Trust Fund, administered by the Pennsylvania Housing Finance Agency.

-other state action regarding housing include encouraging gas companies to invest in housing through the use of the state's Low-income and Neighborhood Assistance tax credit programs; coordinate planning for housing needs and assist the local housing authorities to justify increases in the federally established Fair Market Rent.

-provide additional resources to services for victims of sexual assault and domestic violence.

-provide human service providers access to translation services to meet the needs of the workers and their families who are non-English speakers.

- provide support to address identified human service needs such in education, training, and health care.

Allegheny County Hearing

Hearing summary, South Fayette Township, Washington County

Where: South Fayette Middle School
Testifying: 26
Attendance: 150 citizens from Allegheny, Washington, Westmoreland, Butler, and Greene counties
When: August 31, 2011

The citizens of southwestern Pennsylvania asked for greater local control of the drilling activity affecting their region. They wondered why the gas industry escapes from compliance with many environmental regulations and urged consideration of the cumulative effects of clustered drill sites on air and water.

Urging caution

"Pennsylvania should slow down shale gas development and support local oversight," summarized Cynthia Walter, a Westmoreland County resident and professor at St. Vincent's University.

Policies that promote haste have long-term costs, Walter said. For example, in 2009, the Pennsylvania Department of Environmental Protection (DEP) approved a permit in the required 45 days for a well adjacent to the Beaver Run Reservoir in Westmoreland County. The site, including an open frackwater storage pit, sits uphill and only 100 yards from the reservoir, which provides water to 80,000 residents. After several accidents there, DEP modified its regulations to require drill pads be placed at least 350 yards from similar small water supplies, but the damage here is already done. In case of a spill and water-supply contamination, the 20,000 homeowners dependent on the Beaver Run Reservoir could suffer $200 million in property-value losses, she said.

Local governments should have more oversight and greater authority to control siting of drill pads and when they operate, she said. Wells closer than the 350 yards currently required by DEP regulations should cease operations.

Strict enforcement

Jan Milburn, Westmoreland Citizens Marcellus Group, told the Commission about a series of accidents on area drill sites. An XTO site in St. Clair Township leaked bentonite into the Tubmill Creek, which has been identified by the Western Pennsylvania Conservancy as a priority watershed. The company was cited for discharging industrial waste without a permit and failing to report the leak to DEP. A resident – not the company -- reported the incident, she said.

"To protect air and water, leak detection is critical," Milburn said. "Regular on-site inspections and mandatory reporting should be required."

After a fire that occurred when vapors escaped an improperly managed condensate tank at a drill site in Avella, Washington County, DEP requested that the company "voluntarily" adopt best practices and "strongly encouraged" producers to develop plans to safely control hydrocarbons.

Milburn made a clear point: "The best technology should be mandated, not voluntarily requested of the industry."

Some large frack pits holding drilling flowback water use misters for evaporation of materials including volatile chemicals such as benzene and toluene, and hydrogen sulfide, Milburn also noted. She recommended that on-site frack ponds be banned and that a closed-loop treatment system, such as the one in use on many sites operated by the Hess Corporation in Susquehanna County, be made mandatory for all sites. The Hess system includes on-site treatment, filtering and reverse osmosis, and reuse of water at other sites, which limits opportunity for contamination and reduces water withdrawals.

DEP permits each site individually as a small source of air pollutants but fails to capture the cumulative effect of dozens of clustered sites on area residents, Milburn

said. "The Peck family of Fayette County found out that the compressor station across from their home will be legally permitted to emit 7.66 tons of formaldehyde, 19.33 tons of volatile organic compounds and 7.75 tons of hazardous air pollutants and 54 tons of carbon monoxide each year. Yet the permit does not consider the cumulative effect on air quality of 73 separate wells in the area."

"Please remember. We need your help."

Corinne Harkins, RESIDENCE

Wastewater management

Ned Mulcahy, of the Three Rivers Waterkeeper, a water-quality guardian for the Monongahela, Allegheny, and Ohio rivers and their watersheds, testified to potential threats to groundwater. He was the first of many testifiers at all five hearings report that the oil and gas industry is treated differently from other industries. The gas industry is exempt from the requirements of the federal Safe Drinking Water Act, which strictly limits industrial-waste discharges into ground water.

The sheer volume of wastewater produced and the lack of appropriate water treatment facilities in Pennsylvania is a problem, Mulcahy said. Today's operating wells could produce as much as 4.4 billion gallons of wastewater needing treatment. Currently, only two Pennsylvania treatment facilities are capable of fully treating wastewater, including the heavy metals and salts captured in the flowback. In April 2011, Governor Corbett requested that companies voluntarily stop sending frackwater to Pennsylvania treatment plants, but a uniform, permanent solution for addressing frackwater has not been achieved.

Wastewater should be as be treated as hazardous waste, with comprehensive tracking of output from each well from production to disposal, Mulcahy said.

Measuring cumulative effects

From Joel Osborne, legal director of Group Against Smog and Pollution (GASP), the Commission learned that the U.S. Environmental Protection Agency has already designated Allegheny County as an ozone non-attainment area. But Pennsylvania officials don't measure the cumulative effects of air emissions from natural gas drills, he said.

It's true that natural gas burns cleaner than other fossil fuels, Osborne said, but natural gas drilling produces air emissions at every step of the process. While none of the individual point sources of air pollution on the typical well site might cross the threshold required for permitting and monitoring, the sources should be measured together and their cumulative impacts considered.

Studies from the heavy gas-producing states Colorado and Wyoming link deteriorating air quality to natural gas activities, Osborne noted. For example, the Wyoming Department of Environmental Quality names gas drilling as the reason the state has exceeded federal ozone standards in wintertime. Due to gas activity, states normally considered pristine and unspoiled are developing the air quality problems of more urban, populous states.

Other industries regulated for air emissions are beginning to press for stricter enforcement of air quality standards for drilling, Osborne said. Without them, the companies' own efforts will fail.

Some Pennsylvania DEP air-quality reports declaring that "the air is safe" are inaccurate, Osborne testified. DEP did not test for nitrogen oxides and volatile organic compounds tests in northeast and north central Pennsylvania and didn't account for cumulative effect of all sources on the air near a site.

Finally, he recommended that Pennsylvania adopt the Ohio Environmental Protection Agency recommendation, which would require a drill site permit, and he recommended using the federal definition of pollution source that would require aggregation of small sources of air pollution.

Local control

Local governments should be given some control over zoning of gas drilling facilities, said Deron Gabriel, a South Fayette Township commissioner.

The Oil and Gas Act was meant to regulate the small, less invasive shallow-well industry – not the Marcellus

Shale's big industrial operations that are inappropriate in residential communities, Gabriel said. His constituents have made it quite clear to him that they don't want gas drilling near homes, schools, and kids.

Pam Judy, a fourth-generation farmer from Fayette County, put a face on residents' concerns about industrial activity so close to their homes. There's a compressor station on an adjacent property upwind from her home. She and her daughter can smell diesel and chlorine fumes and have begun to suffer headaches and vomiting, fatigue, and dizziness as a result, she said.

Pam said she requested DEP reports under the PA Right to Know, and was dismayed to find reports and data were missing. She reports knowledge of compressor engines being tested at 60% not 100% capacity which would affect report results.

Gabriel and several other residents spoke with pride about South Fayette Township's ordinance to address the concerns of residents and respect industry needs, and spoke eloquently about the need for local control over siting of drilling operations. Keith McDonough, a parent, said that the neighbors did not believe that placing a drill site two-tenths of a mile from the elementary school was a wise decision. Neighbors joined in the effort for a reasonable zoning ordinance, he said.

Range Resources sat at the table in drafting the township ordinance, but since its adoption, the company is suing to prevent its implementation. Gabriel, McDonough, and many other residents called for state help in defending the ordinance and urged state lawmakers to strengthen the powers of municipalities to address the siting and operation of gas wells in residential communities.

Several residents also argued for a tax on gas drilling but made it clear that adoption of a single uniform zoning ordinance was not an acceptable trade-off.

DEP's role

Many residents voiced their frustration with DEP, which they did not see as sufficiently staffed to conduct continued, rigorous inspection of sites, nor as sufficiently aggressive in protecting the community.

Bob Schmetzer from Beaver County challenged the wisdom of a government that allows chemicals to be put into the environment without knowing the full impact of that decision.

Residents also feared the influence of gas-company money in shaping local and state policy decisions.

"Big money gas companies are coming in to intimidate little South Fayette," said Mike Scheel, a physician from Fayette County.

Contamination and non-disclosure

Most speakers doubted industry claims that no water has been contaminated. Residents spoke of neighbors whose wells were contaminated. Plus, the non-disclosure agreements signed by residents to settle water contamination claims against drillers create a chilling effect on the community. When residents are forced to keep quiet to receive compensation for damages, valuable information that should be shared with the community stays under wraps.

> **"Most homeowners will get no profit from shale gas, yet we bear the risk. After a time the gas companies will run and leave us with undrinkable water and unsellable homes."**
>
> **Dr. John Atherton, Greenburg in Westmoreland County**

Health consequences

Several residents, including two practicing physicians, spoke of their unease about the potential health effects of drilling and wondered if they weren't already witnessing gas-related health problems. Some asked for baseline health monitoring while others stated that the unknowns were too great and the state should ban drilling entirely.

As Lisa Malosh, of South Fayette said, "There is simply not enough research and evidence to say that there are not long-term harmful effects." She wants setbacks of at least one mile from schools.

Philadelphia Hearing

Hearing summary, Philadelphia

Where: Free Library of Philadelphia
Testifying: 32
Attendance: 70 citizens from 14 counties
When: September 7, 2011

Southeastern Pennsylvanians shared their real concern about the potential impact of drilling in northeast Pennsylvania on the 15 million residents who draw their drinking water from the Delaware River.

Principles for moving forward

"Continued insistence by the industry that their practices do not harm health and the environment rests more on wishful thinking and willful denial than evidence or a reliable track record," testified Nadia Steinzor of Earthworks Oil & Gas Project. To date, she said, no state, local, or federal agency has fully analyzed the impact of industry expansion on citizens, and a long-term view should replace a short-term rush to drill.

If drilling is to continue in Pennsylvania and other states, Steinzor argued, it should be guided by four principles: No water pollution, and limited water consumption to protect health and the environment from hazardous chemicals and preserve precious water resources; low emissions to protect health, the environment, and the climate; no-go zones to protect sacred and sensitive natural places, drinking watersheds, agriculture, and other areas; landowner and community consent to support the rights to negotiate with companies and to say no to energy development on one's own property.

Policymakers should level the playing field by reversing the special exemptions that gas companies receive from seven federal laws, including the Safe Drinking Water Act, the Clean Air Act, and the Resource Conservation and Recovery Act, Steinzor said.

Steinzor's call for regulatory changes to better protect people and the environment were echoed time and time again by citizens in their testimony. Natural gas is not a green fuel, she said, but an ongoing source of pollution, and gas should have a brief, transitional role in the move toward clean energy.

Disclosure for public health

Dr. Pouni Saberi, a family physician at the University of Pennsylvania, used language of Pennsylvania Secretary of Health Dr. Eli Avila: "Use science as it pertains to public health effects." The science needed to fully anticipate and understand the effects of gas drilling is "sorely lacking," Saberi said, calling for a moratorium until the science becomes available. The science of public health needs time to catch up to drilling, she said, and until then, she recommended a public health registry in the Pennsylvania Department of Health that includes the nature of complaints, responses, and follow ups.

Walter Tsou, a physician and former Philadelphia health commissioner, succinctly described the hydrofracking process: "We take good water, contaminate it and pump it back in the ground." He reminded the Commission that fracking fluids include methane, anti-freeze, and paint thinner.

Tsou stressed the need for drilling companies to fully disclose the contents of hydrofracking fluids as a public health measure. "Without accurate information, physician's can't help." Policymakers have avoided addressing the potential public health impacts of drilling, which could be substantial, he said. He questioned whether the benefits of natural gas production are worth polluting Pennsylvania's air and water.

Inevitable impact on aquifers

Paul Rubin, a hydrogeologist and president of the consulting firm HydroQuest, shared his report for the Delaware Riverkeeper Network on the potential

impacts of gas drilling on underground aquifers. Rubin got right to the point: Petroleum-industry research has led him to conclude that the confining beds now separating and protecting freshwater aquifers will be breached, resulting in long-term contamination by naturally occurring chemicals and gases, hydrofracking solutions, and saline water.

Rubin studies well-sealant durability and failure, and he urged a very long time horizon in plans to protect freshwater aquifers. Drilling that could impact aquifers should not be considered unless all of the following thresholds are met, he said:

- Cement and steel must be safe for hundreds of thousands of years. Currently, they are only guaranteed for 75 to 100 years.
- Because cement plugs will fail, all existing wells must be replugged every 100 years. Legally binding and enforceable agreements should be made for long-term maintenance of well-sealant materials.
- Drilling should not occur in seismically active areas because of potential damage to the integrity of well sheaths.
- Wells should be sited no closer than 2,100 feet from water supplies, as lesser setbacks have a high probability of degrading water.
- All abandoned wells must be plugged before hydrofracking occurs. Chemicals will follow these existing paths to the surface.
- Old gas wells within 3,000 feet of drinking wells should not be used for reinjection or wastewater storage.

The best sealant technology now available will fail within 100 years, and Pennsylvania could decrease the risk of migration by requiring hydrology testing before drilling, Rubin said.

Lack of oversight impacts erosion

The effects of erosion and sediment discharge and stormwater discharge during construction and operation of Marcellus Shale facilities can adversely impact water quality in Pennsylvania, said Michele Adams, an engineer specializing in stormwater management. Current regulations and policies don't provide sufficient standards, review, and enforcement to protect Pennsylvania's water resources, she said.

She cited a 2007 report by the U.S. Environmental Protection Agency which identifies the types of disturbances created by oil and gas activity: *Demonstrating the Impacts of Oil and Gas Exploration on Water Quality and How to Minimize These Impacts through Targeted Monitoring Activities and Local Ordinances.*

Oil and gas operations are subject to less stringent regulations than other industrial activities, and schools, highways, and homes face far more construction, regulatory review, and performance standards, Adams said. There is little review of sites less than five acres, and their mandated sediment and erosion control plans are not subject to DEP review. Virtually every other industry is subject to review for sites of one acre or more, she said.

Oil and gas activities can access a waiver process for stormwater plans that's not available in other construction activities, Adams said. Sites don't have to be restored to pre-construction levels of erosion control and will likely be sources of stormwater runoff long after well construction, she said.

"Oil and gas facilities should not be excused from implementing necessary measures to protect the waters of the Commonwealth ," Adams said.

Consider the Impact of Pipelines

Deborah Goldberg of Earth Justice testified to the need for a cumulative impact review to include wellpads and pipelines. Ms Goldberg urged environmental review in siting, noting that DEP does not oversee siting of pipelines; only stream crossing, erosion & sediment control and compressor stations.

Ms Goldberg testified the Public Utility Commission has authority to regulate siting, but that as most pipeline companies are not public utilities, the PUC's authority is limited. The gathering lines of the pipeline system are unregulated by PA PUC.

Pipelines create a number of impacts. Thousands of miles in pipeline infrastructure will impact water and land for decades by hard surfaces which increase storm water runoff. Gathering lines and transmission pipelines require compressor stations ,which affect air quality through emission of criteria pollutants and toxic pollutants, and that alter community character. Pipeline

infrastructure development creates roadway impacts from trucks carrying pipes to sites and the whole process results in a noisy, dirty transformation of rural communities.

Ms Goldberg called for greater staff expertise by DEP and a role for pipeline review in the permitting process. Legislation should be adopted that adopt federal minimum regulations and prohibit the use of eminent domain by public utilities.

Enact a Drilling Tax

State Representative Greg Vitali spoke about efforts by state legislators to forcefully address the effects of gas extraction. He said there is no good policy reason not to enact a drilling tax as every other major gas producing state has done.

He reminded the audience that the drilling tax is an environmental issue. It is needed to fund programs like Growing Greener to protect open space, streams, and farmland and will eliminate the pressure to drill in our state forests and parks. He said there are a variety of good bills to enforce a permanent ban on drilling on state lands, address water consumption and air quality issues, and to provide more funding to DEP for enforcement. He said that citizens must be armed with the facts and hold lawmakers accountable.

Quality of life

Paul Roden of Lower Makefield Township, Bucks County, came as an individual but voiced the sentiments of the many audience members who oppose any hydrofracking in the Delaware River. The practice is dangerous for the environment and health of workers, he said, and he's concerned about disposal of frackwater spread on roads for dust control.

Hydrofracking, he said, is too costly and unnecessary, and there are better alternatives. Instead of improving energy independence in the U.S., gas is being exported to other countries, he said.

Susan Patrone, of South Philadelphia, is new to the Marcellus Shale issue. She came to the hearing to express her concern for the 15 million people who draw their drinking water from the Delaware River, despite the basin's small landmass. Like gaming, gas development emphasizes new revenue, lacks a transparent process, and pays little attention to local community impact. She supported the need for new revenue but asked, "Can't we do better than gas and gambling?"

Katrina Kelly, a 20-year-old student at Widener University, Philadelphia, got interested in the issue of gas drilling after taking a class. She was most disturbed that hexavalent chromium -- a dangerous carcinogen used in fracking solution and made famous by the story of Erin Brockovich – could enter drinking water supplies. Pennsylvania water treatment facilities can't adequately treat fracking waste, placing this potent chemical in surface waters for good, she said.

Kelly voiced the fears of her generation about the long-term implications of Pennsylvania's rush to drill: "I don't want to have to worry that I will be unable to have a baby 10 years from now because of a rush to drill today." Kelly said she wrote to Governor Corbett of her concerns and hoped to hear back soon.

She supported the proposed federal FRAC act, which will allow gas drilling but ensure appropriate safeguards.

Documentary photographer Mark Shimmerling, of Huntington Valley, Montgomery County , has traveled around the state to capture the faces and stories of individuals affected by gas drilling. He spoke of Terry Greenwood, a beef farmer from Washington County, who reported methane contamination of three of four water sources on his property and who lost 10 calves in one season – a loss Greenwood attributed to pollution from drilling activity.

Gas development, Shimmerling stated simply, is an industrial activity, taking place in residential communities and around farms, that needs to be regulated as industrial activity.

Hard lessons from coal country

Sarah Caspar, Chester County, drew parallels between the gas boom and Pennsylvania's development of coal. Many people prospered in the coal rush, she said, but many miners died, and later generations were saddled with acid mine drainage and raging fires. Coal-country native Joan Martini, a member of the Communication Workers of America argued that gas drilling is potentially more dangerous than coal.

Lawmakers' job: Protect citizens

Betty Tatham, Holland, Bucks County, testified that many nations, states, and elected officials are stepping away from hydrofracking. The province of Quebec, France, and South Africa have banned hydrofracking, as have numerous local communities, she said.

Elected officials and ordinary citizens feel outraged by tactics of gas companies who put profits before the common good, Tatum said. In New York, Senator Greg Ball stated that "over my dead body would I allow what happened in Pennsylvania to happen in New York." The New Jersey state House's bipartisan and overwhelmingly strong vote for a hydrofracking ban showed that "New Jersey legislators want to protect citizens," Tatum said. "I am waiting for Pennsylvania legislators to do the same."

A study cited in the New York Times showed that 25 percent of children in drilling areas had asthma, compared to 7 percent statewide, Tatum said. "As a grandmother, my biggest concern is the health and future of the children here in Pennsylvania," she said.
Like many Pennsylvanians, Dr. Andrea Brockman of Philadelphia owns a camp in a drilling community, in Muncy Valley, Sullivan County. Brockman is the president of her owners' association and has many dealings with gas companies. She said owners tried to negotiate a good deal with drillers and entered a lease to try to protect their roads and control seismic testing, but citizens have very little control over the safety of public water supplies like the Delaware River. Gas drilling has changed the complexion of her rural retreat: "In Muncy Valley we now see roads cut through forests and a sky filled with stadium lights instead of stars."

Eastern Pennsylvania residents do not yet understand the potential implications of gas drilling on their water supply, and more people need to be concerned, Brockman said.

Many citizens questioned why oil and gas companies can skirt many of the federal environmental regulations imposed on others. Find the loopholes listed at http://pennbpc.org/sites/pennbpc.org/files/CMSC-Phila-Loopholes-for-Polluters.pdf

Williamsport Hearing

Hearing summary, Williamsport, Lycoming County

Where: Lycoming College, Williamsport
Testifying: 19
Attendance: 68 citizens from 10 counties
Date: September 21, 2011

Pennsylvanians are passionate about the state's natural beauty, and they fear gas drilling's impact on hunting, fishing, and other recreational activities. That was the message from witnesses in Williamsport, where Marcellus activity is transforming the region. Speakers talked about the threat to the Pennsylvania Wilds and the industries it supports, including tourism and timber.

Clash of farming and mining

"My family has lived in the Susquehanna River Valley for 200-plus years," Union County farmer Peggy Lauver said to open the hearing. "My father always said that river runs in our blood." In 2005, Lauver was approached by "the land men" but opted not to lease gas rights on her farm. They mentioned there would be "a few trucks but they would repair the damage, and said nothing about water removal, wastewater or fracking fluids."

Pennsylvania is blessed with exquisite mountains, forests and rich mineral deposits, and magnificent waters, Lauer said. The waters of the Susquehanna Valley provide one of the riches estuaries in the world and support Pennsylvania's number one industry — farming. Gas drilling presents a danger to organic farming, she said.

Farmers must comply with the heightened regulations of the Pennsylvania Nutrient Management Act, to address stormwater runoff, erosion, and sedimentation as part of the federal EPA's Chesapeake Bay watershed cleanup plan, she said. "Why doesn't the gas industry have to meet these same standards?" she asked.

Like many subsequent speakers, Lauer said that gas drilling has changed the landscape and sent toxic fluids into streams and private wells. At the Tomes site, she said, neighbors noted methane buildup in their wells and methane bubbling up in the Little Muncy Creek.

Look ahead seven generations

"Our very way of life is in flux," Peggy Lauver told commissioners. Leaders of the Iroquois nation had a Seventh Generation axiom, "traveling" seven generations into the future to review consequences before making major decisions. Pennsylvania policymakers should do the same, Lauer urged.

Kristen Hazeur of Jersey Shore said she's also concerned about children and future generations – especially their exposure to chemicals. Safe levels of toxic chemicals are determined for 155-pound males, she said, not for children. The rising incidences of asthma, ADHD, autism, and allergies prompts caution moving forward, full disclosure of chemicals and inert ingredients, and greater concern for the health of our children. "Children are one-third of our population but 100 percent of our future," she said.

Air quality in Wyoming is approaching that of Los Angeles, said Carmeline Shurba, Loysox Township, the mother of four children -- including two with asthma – who worries about compressor-station emissions. Asthma rates in Texas drilling areas exceed the rest of the state, and she fears for her children's health.

Human error: Accidents will happen

Dr. Robert Meyers, Director of Environmental Science at Lock Haven University, recounted blowouts, overflowing wastewater pits, and unattended wastewater tanks that caused thousands of gallons of chemicals to enter rivers, high-value streams, and drinking wells. Often, companies waited hours or even days to report the spills.

"Accidents are endemic to the industry," he testified. One company was cited for 174 violations in 2010 but

but paid just $20,500 in fines for the year. Another company considered a responsible driller, was cited 80 times during the year, including four times for allowing faulty well casings. This company was responsible for several spills, including 12,000 gallons of synthetic mud discharged into Sproul State Forest, 150 gallons of frack solutions spilled onto the ground in Centre County, and production fluid pouring from an uncapped line in December 2010.

Even best practices and rigorous enforcement can't prevent human error, Meyers said. The industry's comparison to driving -- "We don't ban cars because people have accidents" -- is not persuasive, he said. "Cars that are faulty are recalled, vehicles are not permitted in sensitive areas, and the licenses of repeat offenders are taken."

Ted Stroter of Williamsport, a chemical and environmental engineer who recently retired from the gas industry, reminded the Commission that gas drilling is exempt from a number of federal environmental laws, including RCRA, Safe Drinking Water, and Clean Air. If RCRA requirements were applied, wastewater – like hazardous waste— could be responsibly tracked, just as hazardous waste is tracked.

"My conclusion, as a chemical engineer, is that industry is out of control," Stroter said. Accidents happen every day that are buried rather than reported, and strict financial penalties for violations and jail time for the CEO, as required in RCRA, should be imposed, he argued. "As the on-site manager for 100 subcontractors, I had to make sure they all adhered to quality standards, and my ability to close down a site brought about the compliance I wanted. DEP should have that power and use it."

A sustainable drilling tax

A drilling tax should be imposed, and it wouldn't have a substantial impact on industry, testified Penn State University professor Rose Baker. Some of Pennsylvania's 3 percent economic growth in 2010 is attributable to the gas industry. The core oil and gas sectors employ 369,000 workers, of some 7.1 million workers statewide, and by 2016, the sector will add about 12,000 jobs.

A severance tax or an impact fee is a production cost for the gas companies, Baker said. Relative to the Pennsylvania economy, the negative effects of collecting a severance tax or an impact fee from the gas companies are small and similar to the normal rise and fall of the Pennsylvania economy.

On the other hand, townships and boroughs feel a dramatic impact from a severance tax or impact fee, Baker said. These funds disbursed to a township or borough budget may be enough to make a significant difference in municipal operations.

Human costs of ecological damage

Kevin Heatley, restoration ecologist, knows that threats to state forests and habitats have implications for public health and are costly to address. He recently restored wetlands in Louisiana damaged by oil and gas channels. The loss of those wetlands contributed to the devastation of Hurricane Katrina, and repair of just five of the 10,000 damaged miles will cost Louisiana $1.2 million.

Cascading ecological impacts can permanently alter the landscape, with consequences for the public, he said. For instance, the loss of predators for deer contributed to the Lyme disease epidemic, and pallets imported from China introduce insects that devastate hardwoods.

"It saddens me that the environmental gains we have made during my lifetime will be lost."
Dan Alters, Hatburn Township

"We jumped into this way too soon," she said. "Science and the regulatory structure are not in place."
Judy Stumpf, Trout Run

Pennsylvania's large swath of core interior forests – unique to the Northeast – will grow in value if left untouched, Heatley said. Removal of forest cover and development of well pads, roads, and compressor stations each contributes to degradation of the forest and reduces its value.

Healthy living in the outdoors

Jerry Walls, a retired planner, said there is a basic unfairness in Pennsylvania's regulatory structure: "Why does Pennsylvania allow the gas industry to operate with regulations that are substandard, and less than existing industries must meet?"

Walls shared a written analysis of the benefits and impacts of the industry, but his testimony drove home his concerns about the degradation of recreational lands and likely health impacts of drilling. The industry has closed off access to public trails where leases are in place, he said, and he has personally been turned away by industry security from the scenic overlook at Pine Creek Trail.

He worries about road dust from hundreds of trucks and the release of toxins that will lead to severe public health effects in the future. Health problems will be acknowledged too late to for adequate prevention and treatment, he said.

Walls said the gas boom can help to re-fund conservation, outdoor, and healthy living policies that have been so successful and called for a tax on natural gas production and elimination of sales tax exemptions for downhole drilling equipment. He said the original uses of the Oil and Gas Fund for conservation should be restored.

Dan Alters of Hatburn Township, a retired DEP water management official, argued that the region is no longer wild and scenic, and he lamented the failure to vigorously protect the environment. "It saddens me that the environmental gains we have made during my lifetime will be lost."

Alters testified that DEP has not – and, under current law, cannot — evaluate the cumulative impacts of all the permits it reviews. Massive gas development will result in forest fragmentation, stormwater impacts, lower stream runoff in dry season, and habitat changes, he said. DEP needs more resources and should return permit review to the field.

Margaret Cronin, of Williamsport,fears that the PA Wilds will be nothing more than a glossy brochure. Growing up on the Jersey Shore, she has learned what happens when development occurs in an unregulated manner.

Judy Stumpf of Trout Run retired from the Pennsylvania DEP and moved back where she was born. She is most concerned about new pipelines crisscrossing the landscape. She said one company's pipeline plan will cross Larry's Creek 19 times over 20 miles. The industry requires a whole new infrastructure of pipelines and compressor stations that have long-lasting impacts. "We jumped into this way too soon," she said. "Science and the regulatory structure are not in place."

Harvey Katz of Williamsport reminded Commission members that much of the state, from the Alleghenies in the west to Ricketts Glen in the northeast, is forested area. As of 2006, it was still pure enough to be proposed as the 59th national park. Gas drilling has the potential to remove large acreage from that tract, he said. "Protect our natural environment as if our lives depend on it," he said, "because it does."

Information gaps

On behalf of the Responsible Drilling Alliance, Ralph Kisberg testified about worries over the rapid buildup of pipelines and compressors, and the lack of timely, available information about pipeline infrastructure.

Catherine Smith of Spring Mills is an academic specializing in communicating risk and risk in public policy. Comments made by Penn State Professor Terry Engelder in Nature magazine "reflect an arrogance that many industries have worked to avoid," she said. The industry is "out of date," because other industries recognize the value of engaging with stakeholders rather than dismissing them.

Gerry Walls, the retired planner, noted that the inclusion of non-disclosure agreements in legal settlements seals information that could help protect public health.

Taking a bite out of tourism

Charles Gerlach's bed and breakfast in Bradford County welcomes guests who come from all over the world to see farms, quaint villages, and pristine forests. Instead, they're finding drill sites, roads, and truck traffic. Gas drilling puts 400,000 tourism jobs for Pennsylvania residents at risk in a $44 billion business. "No one wants to vacation in an energy park," he said.

Control erosion through stormwater plans

James Dunne is an Armstrong Township supervisor who testified as a citizen about stormwater management. His township holds all the drinking water for the community, he said. Erosion and sedimentation plans are on based on one-day storm events, but they should be based on 100-year or 500-year events, because of the region's steep slopes and the high runoff rates at drill sites.

Gas drilling has been developed with poor planning and poor regulation, Dunne said. Thresholds for conservation district permits have to be increased. "As a municipal planner, I require a higher level of sediment control for housing developments," Dunne said. He called for an impact fee to fund public water supplies, and for legal support for local governments that have to review permits and defend decisions. "We have a sound zoning ordinance," he said. "For a minuscule amount of money, I wouldn't consider a statewide ordinance."

"We have a sound zoning ordinance. For a minuscule amount of money, I wouldn't consider a statewide ordinance."

James Dunne, Armstrong Township

Wysox Hearing

Hearing summary, Wysox, Bradford County

Where: Wysox Fire Hall, Bradford county
Testifying: 22
Attendance: 65 citizens from 11 counties
Date: September 22, 2011

Joanne Fiorito of Towanda represented the group NEPA Gas Action, which monitors industry practices and reports violations to the DEP. Her observations indicate that the industry is not employing best practices or adhering to high standards in its operations.

She owns 28 acres and she and her neighbors are very close to pipelines and a compressor station. Without zoning protection pipelines are encroaching on residential property. She believes the compressor station is unsafe for her health and that of her neighbors, and has to cope with blasting on her property, for which neighbors are given no warning. "I have complained to my township officials to no avail," she says.

Joanne was surprised to learn that her group has been placed on a homeland security watch list because of its activities, which include videotaping at drill sites. "Pennsylvania is in for a crude awakening."

Vera Scruggins, from Brackney, Susquehanna County appeared for Citizens for Clean Water and talked about "the industrialization of her town". The industry has an ever increasing footprint which has changed the character of the community and caused numerous problems for residents. New wells, pipelines, storage sites and compressor stations require the clearing of trees and plant life.

"The process is intrusive to our senses" she says. She reports never ending truck traffic, helicopters, and poor air quality from all the diesel trucks on sites. Crime rates have increased and people feel less safe in their homes and on the road. "The area is no longer rural", she said.

90% of drilling jobs are from out of state or out of county. "I see no economic boom, the only boom I expect is an explosion."

Vera is very concerned about the impact of drilling on drinking water. She reported that 21 families along Carter Rd. in Dimock have water delivered because their wells are contaminated . The Duke University study of the area has confirmed methane migration which poses serious threat to wells. Half the well casings tested have failed, she reports. (Note: On October 19 the PA-DEP gave permission to Cabot Oil and Gas to suspend delivery of water to homes with contaminated wells).

Pipelines and compressor stations add to the problem with emissions of toxic chemicals, but no cumulative impact studies have been done to examine the effect of the growing number of sites on air quality.

Duke Barrett of Gas Drilling Awareness told the group that industry's primary goal is not to create jobs or energy but to make money. He likened the industry to the coal or cigarette industries. He is worried that local officials do not have the ability to properly zone this invasive activity and that industry uses the Oil and Gas Act, which prevents local governments from placing reasonable limits on drilling operations, to justify its actions.

Diane Siegmaud from Towanda showed the Commission a six inch binder in which she documents the harm done by drilling to Bradford county, including spills, explosions and water contamination. She said Governor Corbett has stated that he has seen no empirical evidence that gas drilling is unsafe; and shared a study by PEHSU that points to the risks to children from hydrofracking. "This study raises enough concerns that we should proceed with caution, instead we proceed with vigor", she said.

The DEP is giving out permits too easily and she feels people have nowhere to go with their complaints.

Steve Simko of Harding in Luzerne county is worried about the effects of drilling on underground aquifers. Well bore casings are insufficient and fail, and the

standards, which require casings only 50 feet pass aquifers, are insufficient . He reports 65 well casing violations in 2011 to date and more than 600 gas pipeline explosions on record.

Like many citizens the Commission has heard from, Mr. Simko believes many local officials are pro-industry, but says citizens complaints must be addressed. " Every town has a group" he says, "and the people have spoken up. There has to be a reason why."

Carolyn Knapp, of Ulster, Bradford county is an organic dairy farmer and a grandmother. She is concerned about long term impacts of drilling on children and on the quality of her product.

" Every town has a group" he says, "and the people have spoken up. There has to be a reason why."
Steve Simko

"Never have I seen and industry given free rein like the gas industry," she said.

She has signed a lease and has a leaseholders group, but fears the DEP just doesn't have the tools to adequately regulate the industry. She recommends that fines be increased and that new permits be withheld from repeat offenders. She would like to see DEP get a hold for testing logs before permitting, occurs which is critical to identifying and controlling problems.

Carolyn said that there should be disclosure of risks to homeowners, just as there is to shareholders. "Time is of the essence", she said. This must be done before industry continues. "We have a reasonable right to be protected from an industry that has blind-sided us."

Richard Ide of Tunkhannock in Wyoming County spoke out against forced pooling. He owns 300 acres which he has not leased and does not want to be forced to have drilling on his land. He has visited Texas and heard the same complaints made to the Citizens Commission that evening.

The industry has been able to achieve forced pooling in 39 states, he said, it is cheaper for the industry but worse for the leaseholders. Forced pooling should be prohibited in Pennsylvania.

Diane Ward, a 38 year resident of Wysox talked about the need for stronger laws and the importance of restoring Conservation Districts to the review process. " There are no checks and balances on this industry," she said. Legislation is necessary to protect private drinking water, setbacks need to be increased and the zone of presumed liability for drinking water contamination needs to be expanded.

"The company I worked for Proctor and Gamble is an upstanding company," she said. "The gas companies are not."

Diane urged that gathering lines for gas distribution need to be regulated by the state, but pipeline companies should not be given eminent domain powers.

She said the touted jobs for residents don't help most people. " Who wants to work 100 hours a week. If you are a single parent forget it." Family farms, she says, have not been saved, they have been decimated.

Brett Jennings of Great Bend, Susquehanna County, raised concerns about the effect of increased sedimentation loads on the Susquehanna watershed. He is a counselor for Great Bend Borough Director of the Halstead Great Bend Sewer Authority and a member of the Susquehanna Council of Governments. He cited environmental assessments in NY and West Virginia stating sediment loads could be as much as 6.3 tons per well site, and deforestation as much as 46 sq. miles for 2000 well pads.

Gas drilling will make it harder for states to achieve goals of Chesapeake Bay cleanup plan, which has consequences for other industries. Developers, farmers and loggers will all have reduced sediment loads. "I wonder what will happen to other industries because of the gas industry."

Craig Stevens, an eighth generation resident of Montrose, has started a patriots group for citizens because he feel the industry tramples on his rights as a property owner.

When he refused to sign a lease, the company went to his 95 year old mother in a nursing home, who co-owned

the property. He was subjected to seismic testing on the property because the law says only 1% of the ownership has to agree. There is a pipeline through his land and that of his neighbors, which many did not agree to. When he complained he was told the company would steal his land.

The residents are ill-prepared to negotiate with industry and getting a bad deal. "My neighbor got $5 per acre, in other states the company is pay $4000 per acre.

He is offended that the industry is calling the people from Dimock liars. "we received $12 million from the state then it was taken away," he said.

"I understand the money," he said. "Here's what I don't understand . If you are a landowner there are things you can't do on your property. Nowhere in the Constitution or the Bible does it give industry these rights."

John Kesich of Millerton Tioga county asked why the industry is held to minimal standards. "When the landfill in my county wanted to expand they had a box full of documents," he said. "The gas industry is in the process of creating a 10,000 square mile industrial site. What modern civilized society would do this without a comprehensive analysis?" he asked.

He raised concerns about non-disclosure agreements, citing a case of heavy metal poisoning, in which the company agreed to a settlement but required non-disclosure. "This isn't right" he said.

Dave DeCristo, of Canton, Leroy Township, is one of the businesspeople who has benefitted from the industry. His plumbing and HVAC business have grown, he was able to keep 13 people and add 47 jobs during the recession. He pays between $14 and $21 dollars an hour. "The industry has taken a lot of people who would have lost their jobs and helped them to survive," he said.

He pointed to other benefits. Truck drivers who used to travel can now stay home at night with their families and farmers can keep their farms because of gas leases. Canton has sold water, allowing it to pay off a $1 million Pennvest loan and reduce water bills to the borough.

"There are a lot of positives, but there are negatives," he said. "There is a lot of traffic. We see half hour traffic jams. We are going to have to adapt."

Ralph Kisberg of Williamsport, speaking for Responsible Drilling Alliance, told the commission he worked in the industry as a young man, and observed the operations: "They had time and money pressures and they just wanted everyone to get out of the way."

He worries about the impact of well bores so close together. The pipes shift and industry has to call in specialists to find them. North Dakota requires this information, DEP should as well.

The DEP cannot keep stamping out permits, and a cumulative impact study should be done.

Gabriel Spencer, of Bradford County, told the commission that he is a single dad and that the environment is not his issue. "I am just trying to take care of my kid."

He said it sounds stupid, but sexually transmitted diseases (STDS) and crime are going through the roof and people want to leave. "Everyone I talked to feels this way."

Crystal Stroud has been a resident of Bradford county her whole life and thought the industry would be good for the area. But she became sick and water testing confirmed a host of heavy metals in her well.
She is outside the 1000 foot zone of presumption and is unable to get water from the drilling company. She and her husband have had to leave their house, and rent a new one, even though they are paying the mortgage on the first home.

"I want my house back and my life back," she said. Crystal has owned a hair salon for 11 years and is fearful of crime. She told of 7 rapes in Towanda township that involved the use of a date rape drug.

"The area is no longer rural"
Vera Scruggins

"The gas industry is in the process of creating a 10,000 square mile industrial site. What modern civilized society would do this without a comprehensive analysis?"
John Kesich

"The out- of -towners have rap sheets a mile long, and our husbands don't want us to go out for Girl's Night anymore."

Shellie Northrup of Sayre, in Bradford county is concerned about the impact on water supplies and the growing urbanization of the area. "Up until 3 years ago I thought this was the best place on earth to live, and now I would like to find some other place."

Dan Natt of Wysox is a veteran who doesn't buy the line that gas is crucial to our energy independence. Gas prices he says are $10 in Europe and $12 in Japan compared to $3.25 here. The gas will go overseas.

Bill Ferullo is on the planning commission in Warren Township. He has a 30 inch pipeline one-quarter mile from his house that had a leak, which her reported, but which took 6 hours to be shut down. " We don't have an adequate response in this state for a gas emergency," he said.

Mike Martin, a local businessman has seen his business grow because of the gas industry. He has 7 employees in NY and 43 in Pennsylvania, and he stressed that the gas industry has high safety standards and has raised the safety bar for his employees.

"I feel bad for residents who aren't benefiting," he said, "but I feel good for families who live here who we can now employ."

Dave Luty has leased three acres of his property, but feels the gas company has been deceitful in its dealings with him and his family. He gets letters from the company urging him to engage in lobbying to fight regulations of pipelines and protections for the Chesapeake bay, which he finds offensive. "They don't care about people," he said. "This is just big oil and we can't stop them."

Harrisburg Hearing

Hearing summary, Harrisburg, Dauphin County

Where: Widener Law School, Susquehanna Township
Testifying: 17
Attendance: 50 citizens from 8 counties
When: September 26, 2011

Central Pennsylvania citizens expressed their fears about the effect of inadequate regulation in producing communities on water resources in the Susquehanna River watershed, hundreds of miles downstream. Commissioners heard testimony on the effect of Marcellus Shale drilling on jobs, housing, and domestic violence services in drilling communities.

Level the playing field for responsible drillers

Dr. James Schmid, President of Schmid and Company Consulting Ecologist, Delaware County, told the Commission that Pennsylvania's Constitution, laws, and regulations give citizens an expectation of environmental protection. But in the case of long-wall mining, "the Department of Environmental Protection (DEP) pretends it regulates the industry and the industry pretends it is regulated." Now, the same dynamic may be happening with natural gas.

In Schmid's nearly 30 years of experience, DEP has been very slow to regulate new technology. For Marcellus Shale, the permit process is piecemeal, fragmented, and fractured. He worries that gas development is permitted in small bits, with wells, well pads, roads, pipelines and compressors each reviewed in isolation. Resources such as streams on sites are not assessed, he has found, and alternatives to avoid adverse impacts haven't been considered.

"This process keeps the public from seeing what is planned and keeps regulators from seeing the whole process and evaluating its ultimate impact."

The special rules for oil and gas are less stringent than those for other industries, and DEP often uses discretion to waive environmental assessments – an abuse of the regulatory process, he said.

"People have a right to expect that companies will adhere to rules that are established," Schmid stressed.

The issue is one of governance, he said. The industry will comply if regulations are created in a competitive market. Otherwise, firms that do the right thing will suffer in competition with firms that do the wrong thing. DEP needs to enforce existing laws, elected officials need to improve the law, and citizens must get involved.

An objective jobs count

Dr. Stephen Herzenberg of the Keystone Research Center, Harrisburg, discussed the controversial issue of job creation in the Marcellus region.

> "I have had the opportunity to drink safe water and breathe free air, and the freedom to climb in the woods and mountains. All I ask is that my grandchildren be able to do the same."
>
> Barbara Van Horn

According to the Pennsylvania Department of Labor and Industry, employment in six core gas industries in Pennsylvania doubled from the end of 2007 to the end of 2010, from 9,000 jobs to 16,000 jobs. And Penn State's Tim Kelsey calculated 23,000 to 24,000 indirect jobs in 2009 in ancillary industries.

That is an important number of jobs, but it won't save Pennsylvania, Herzenberg said. With a current jobs deficit of 240,000 jobs, Pennsylvania needs 10 times as many jobs to return to pre-recession levels.

The industry's job impact has been overstated in three ways, Herzenberg said:

- Confusing new hires with new jobs, when they're not the same. Fifty jobs in one McDonald's franchise may turn over four times, so the new hires database will show 200 new hires, but the McDonald's hasn't created a single new job. In Marcellus, there are 30 new hires for every new job.

- Counting every job in secondary or "ancillary" industries as a Marcellus job. Not all jobs in iron and steel, general freight trucking, and blood testing, for instance, are related to gas drilling.

- Using unreasonable assumptions to inflate the impact of royalty payments on the economy. A study by Tim Considine for the Marcellus Shale Coalition estimated that 95 percent was spent in the state in one year, but a similar study in Louisiana pegged the rate at 5 percent.

Policies should address the industry's short- and long-term effects, Herzenberg said. Jobs should be going to Pennsylvanians, including unemployed construction workers. A lot of evidence shows that boom and bust cycles leave rural areas poorer than when they started. At one time, Venango County was the richest in the country. Pennsylvania should take a cue from other states and establish trust funds to pay for post-boom transition.

Protect state parks and sustainable certifications in state forests

The economic opportunities of the Marcellus Shale must be balanced with resources protection, testified former Department of Conservation and Natural Resources (DCNR) Secretary John Quigley.

Marcellus Shale development could threaten other important Pennsylvania industries, Quigley warned. Pennsylvania is the largest producer of hardwoods in the nation, with an industry that employs 10 percent of the state's manufacturing workforce and involves 3,000 separate businesses.

Fully 88 percent of wood produced from state forests are certified as sustainably produced, which provides an important price premium that has helped the industry during the recession.

DCNR has been leasing its state forests since 1947, and about 200 wells are currently drilled, but that number could swell to 6,000 to 12,000 wells, Quigley said. A DCNR-commissioned study concluded that any leasing that includes surface disturbance will place sustainable certification in jeopardy. According to a recent Quinnipiac University poll, 72 percent of Pennsylvanians would support a moratorium on further leasing in state forests.

The Nature Conservancy projects that 60,000 wells over the next 20 years will disrupt 3 percent to 8 percent of state forest, Quigley said. Fragmenting could be enormous, and no one understands the cumulative impact, he said.

DCNR has also identified best management practices for drilling in state forests, which could be used to guide gas development in other areas.

State parks present an even more challenging problem, Quigley testified. The Commonwealth's 119 parks are visited by 38 million people each year. Sixty one percent of parks are in the Marcellus area, and 80 percent of mineral rights are owned by others, leaving these treasures open to disruptive and damaging drilling. Horizontal drilling could allow minerals to be accessed from outside, but in that case, the Commonwealth should be compensated. Pennsylvania should follow the lead of West Virginia and prohibit any drilling that disturbs surface lands, he argued.

"State lands support our economy and our spirits," Quigley concluded. "Prudent policy and uncompromising stewardship of our public lands should be our goal."

Water protection regulations

Tom Daniels, a regional planner at the University of Pennsylvania, Philadelphia, testified on behalf of the Delaware Riverkeeper. His issues were specific to the Delaware River but applied in many ways to other important state watersheds.

The Delaware River Basin Commission (DRBC) anticipates thousands of wells, most in the 197-mile special protection waters between Hancock, NY, and Trenton, NJ, Daniels testified. This area is subject to stricter controls because the waterway has greater significance for water supplies and for its scenic beauty.

He raised three areas of concern: Water removal which may reduce flows in streams and aquifers, discharge of toxic chemicals into waterways, and safe disposal of wastewater from hydrofracking.

Proposed regulations do not adequately protect water, Daniels said. Some chemicals are in numbers above safe concentrations, and petrochemical fluids have no safe level. Deforestation could increase erosion, and expected sediment compaction will further impact water supplies.

Neither DRBC nor DEP is considering a cumulative impact analysis, which undermines the DRBC's ability to promulgate effective regulations. If DRBC fails to undertake an appropriate cumulative impact study, DEP should be directed to do it, he said.

From sludge to food chain

Sue Fox, a commissioner in Shrewsbury Township, York County, identified problems with the application of sludge from wastewater treatment plants that accept frackwater on midstate farmlands. Chemicals become more highly concentrated in the sludge, and animals ingest the hay grown on sludge-enhanced sites, sending those chemicals into the food chain, she said. Contaminants also leach off, further degrading groundwater.

"I am not a scientist, but I have common sense," Fox said. "We know they don't have the technology to take out pollutants in the water." More research should be done before wastewater sludge is approved for use on farms, she said.

Costs to tourism, agriculture, and jobs

Barbara Van Horn, 80 years old and a lifelong Pennsylvania resident, worries about the loss of the Pennsylvania Wilds. "I have had the opportunity to drink safe water and breathe free air, and the freedom to climb in the woods and mountains. All I ask is that my grandchildren be able to do the same."

Dan Shearer, of Halifax Dauphin County, was compelled to testify after a drive out West. In North Dakota, he and his wife stopped atop a ridge -- and had a 360- degree view filled with flaring gas wells. "If people could see this in Pennsylvania, they would know what we are in for," he said.

There has not been an unbiased examination of job and economic activity due to the Marcellus, said Michael Mark, Derry Township, who has worked for the National Weather Service and Pennsylvania DEP. He cites potential negative impacts in three areas:

- Tourism: Leisure travelers spend $26 billion in Pennsylvania, and tourism accounts for 283,000 direct jobs. The Marcellus overlays the Pennsylvania Wilds, and tourism could be affected.
- Forest products: The Forest Products Council has pointed out problems with gas drilling in its yearly sustainability certification audit.
- Agriculture: 63,000 farm families account for $6.1 billion in income and 7 million acres of Pennsylvania land.

Headwaters Economics studies the impact of mineral extraction in western states. A study found less employment growth, lower personal income, less education, and less ability to attract investment and retirement income in 26 drilling counties compared to 250 non-drilling counties.

Karl Dunkelberg, of Wormleysburg, testified that he hunts and fishes in the lands over the Marcellus formation. Fracking would be wonderful if the market is in the U.S., he said, but 70 percent of the gas will go overseas. He's concerned that frack water will leak, even with best practices, and recommended large bonds to cover the costs of cleanup and the ability to keep out bad actors with repeated violations.

Clean energy: A more productive investment

The Commonwealth should be investing in clean energy, which produces more jobs, said Steve Isso, of Brogue, York County. Every $1 million invested in oil and coal produces 1 job while solar produces 4.7 jobs and wind, 4.5 jobs. A 2005 U.S. Department of Energy report found that offshore wind could account for 70

percent of U.S. electricity needs, making it a viable option.

Housing squeeze sends homelessness rising

The natural gas boom has made it hard for families in drilling communities to afford housing, said Cindy Daly from the Housing Alliance of Pennsylvania. Even before the Marcellus drilling boom, counties in the Northeast region has a combined shortage of more than 5000 affordable housing units.

The typical Federal Housing Choice Voucher is $579 in Bradford County and $607 in Tioga County, but families are turning in their vouchers, unable to find housing in an area where industry demand has driven the market rate to $1,000 to $1,200 a month.

> "This process keeps the public from seeing what is planned and keeps regulators from seeing the whole process and evaluating its ultimate impact."
> James Schmid

In Sullivan County, there's a waiting list for the first time, homelessness is up 20 percent, and victims of domestic violence are returning to abusive homes. Bradford County has 105 more children in foster care, because parents can't find affordable housing.

Agencies that work with the homeless have vouchers, but no hotel rooms. One worker gave a family a tent. The lack of affordable housing causes homelessness, and the solution is restoring balance in the housing market, Daly said. The state could help by encouraging gas companies to invest in community homes by participating in the Neighborhood Development Tax Credit.

Planning is necessary because each community is different. Some communities have available vacant housing that could be used, while others may have rental properties available. Local housing authorities and the governor's office could work with the U.S. Department of Housing and Urban Development to increase rates for housing vouchers in these communities.

Domestic violence victims: Nowhere to turn

Shale development is affecting 60 domestic violence programs and shelters in Pennsylvania, said Nicole Lindemyer, public policy manager for the Pennsylvania Coalition Against Domestic Violence, Harrisburg.
She urged the Commission to consider impacts on all human services providers in gas drilling counties. One recent study reported that 18 percent of shale-area governments see an increase in tax revenue, but 20 percent have increased drilling-related costs.

Victims of domestic violence navigate many systems, but Lindemyer sees two large impacts:

- Increase in demand for services. While no population is immune, many workers come from out of state and bring wives and girlfriends from Texas, Oklahoma, and New Mexico. Victims of assault are absolutely stuck, miles from town and not knowing anyone. They have greater needs and fewer resources, with nowhere to go once their 30 days of emergency services are depleted. One domestic violence program had no choice but to put families on a bus and send them back to Texas. Most shale communities are rural and homogenous, with only English speakers, and domestic violence programs need materials, translators, and Spanish-speaking staff.

- An acute lack of housing, particularly for battered women. Rents have risen, from $400 to $1,000, and there are no hotel rooms available for temporary housing.

Lindemyer said another common effect is hatred, resentment, rage, and racism toward out-of-state Hispanic workers and toward the jobs being filled by experienced non-Pennsylvanians. There is a nearly palpable sense of hostility brewing , she said.

Statewide impact

Elaine Lapp-Esch of the Lancaster County-based Community Action Forum on Marcellus Shale had some very specific recommendations for the Citizens Commission:

- Ban holding pits on gas well pads, which leak. In 2009, there were 841 documented cases of contamination from holding pits.
- Increase bonding requirements from the current level of $10,000 per well.

- Restrict water withdrawals. The Susquehanna River Basin Commission has allowed withdrawals of 120 million gallons per day -- a concern for Lancaster and other downstream communities.
- Ban waste discharge into rivers through municipal sewage treatment facilities. A voluntary plan is not sufficient.
- Impose a moratorium on leasing in state lands.
- Impose a drilling tax of at least 5 percent.
- Don't use taxpayer money to subsidize the gas industry and increase demand.
- Don't present natural gas, a fossil fuel, as an alternative fuel.
- Prohibit forced pooling, eminent domain, and a single statewide zoning ordinance.
- Charge drillers fees for access pads, roads, and every time a well is fracked.
- Don't tell the public that gas drilling is patriotic or will improve energy independence, as much of the gas produced in Pennsylvania is likely to be shipped overseas where the price is higher.
- Don't ignore citizens outside drilling communities or discount their opinions. "Our opinions aren't clouded by financial gain," she said.

Other witnesses also spoke of the impacts of drilling that radiate statewide. Henry Drachler, equal employment opportunity specialist at the Federal Highway Administration, said that the Marcellus boom has not provided opportunities for historically disadvantaged firms. The Commonwealth should inform these firms about contracting opportunities, he suggested.

Jane Hosey, Carlisle, said that a friend in Jefferson County discovered that seismic testing had been done around her home without permission, turning her pristine well water to red, bubbly mud. The friend and her husband are paying for water and worry because a well pad is planned 40 feet from their garden.

Hosey had a simple message: Slow down. "What's the rush?" she asked. Marcellus is one of 680 shale plays. That is a lot of air, water, land that will be impacted.

Like Hosey, Anna Pinka of Lebanon County said simply: "This industry arrived before we were ready. Why don't we slow down and put in place the necessary regulations to protect water and land?" Hosey owns property in Sullivan County and spoke of neighbors who signed bad leases, compressor stations with no pollution controls, and flaring of methane gas. Watching the industry unfold and understanding the impacts firsthand, she argued for setbacks of at least 1,000 feet and a ban on drilling in environmentally sensitive areas and on state lands.

Hosey said that her experience with leasing her land has left her "tired of worrying about a well pad that hasn't been permitted but we are told is coming. I am tired of testing for Total Dissolved Solids (TDS) every time we go to the property. I am tired of regretting forever the non surface activity lease we signed as a protection. I am tired of Pennsylvania's natural gas being presented as our patriotic duty, because we know plans are in place to export gas to better paying markets. Finally, I am tired of being told that this is the only answer for our energy and economic woes."

Ed Charles, Mechanicsburg, worries that little is known about the underground mineral rights of land in Pennsylvania. He suggested developing a database that makes information available and transparent.

Autumn Kraus from Lebanon expressed fear for her young children. With so little known about the impacts of gas, she finds the risk unacceptable.

"I am tired.... I am tired of Pennsylvania's natural gas being presented as our patriotic duty, because we know plans are in place to export gas to better paying markets. Finally, I am tired of being told that this is the only answer for our energy and economic woes."

Jane Hosey, Carlisle.


RESIDUAL
WASTE

Issue Exploration: Frack Water Disposal

The heart of the matter: Hydraulic fracturing, or hydrofracking, may be the most controversial and dangerous element of the process used in extracting natural gas from the Marcellus Shale. It pumps millions of gallons of water laced with sand and chemicals into the well at extremely high pressure. Much of it remains in the ground, but according to most authorities, the 15 percent known as flowback, or produced water, returns to the surface as wastewater -- still laced with chemicals, sand and the brine and other materials extracted from deep underground. Different drilling companies employ different methods to store and dispose of wastewater. Because proper disposal is costly, the Department of Environmental Protection should identify and enforce best practices to protect private wells, public water supplies, and surface waterways.

Citizens Commission Findings

Scores of citizens testified that they and their neighbors have experienced devastating effects from flowback after hydraulic fracking. They're puzzled and tired of hearing that "there has never been any drinking water negatively affected by fracking," or that "the problems are the result of a pre-existing condition" because they have experienced and observed otherwise.

Two studies support their position: A 1987 Environmental Protection Agency report which determined that fracturing a natural gas well in West Virginia was responsible for contaminating an underground drinking water source[1] , and a Duke University study which identified hydrofracked wells in northeast Pennsylvania as the source of well contamination.[2]

Citizens spoke of neighbors who have alleged well contamination and entered into out-of-court, sealed settlements with gag orders – clear evidence, they say, that the industry knows it has contaminated water supplies and wants to avoid public disclosure.

Visiting the Susquehanna County community of Dimmock, Commission members saw numerous homes with methane monitors and industry-provided water supplies, called water buffalos, that were installed after well testing found contamination.

Many citizens worried about the wastewater fluids returning to the surface and about those fluids that remained in the ground. Noting that fluids in the earth migrate, a few expressed concern that fracking fluid laced with toxic chemicals might find its way into aquifers decades later which will adversely affect future generations. Several mentioned the potential for methane migration through the thousands of orphan shallow wells that dot the landscape.

One hydrogeologist also indicated that cement casings and plugs endure for only about 75 to 100 years. After that, they fail. Such failure would certainly permit migration of fracking fluids and methane not only to aquifers but also back to the surface. The recent earthquake centered in Virginia and felt in Pennsylvania justified concerns that such movements of the earth could hasten damage to abandoned well casings and plugs, and then force fluids into places they might not ordinarily migrate.

A few citizens expressed their concerns about the chemicals and total dissolved solids (TDS) removed from frack water at waste treatment facilities but still resident in the resulting sludge. If the residue in the sludge from water treatment is mishandled, the impact can be just as devastating as if it had not been treated.

Nearly every person who offered testimony before this Commission, whether as a citizen or an expert, expressed major concerns about the extent to which their health and safety were being compromised by the natural gas industry. The majority at least mentioned their fear that sources of safe drinking water were threatened, now or in the future. At the very least, public officials must address the anxiety prevalent among Pennsylvanians, but more importantly, they must take measures to

1 *{EPA Report to Congress: Management of Wastes from the Exploration, Development, and Production of Crude Oil, Natural Gas, and Geothermal Energy, publication number 530SW88003.}*

2 http://www.propublica.org/documents/item/methane-contamination-of-drinking-water-accompanying-gas-well-drilling

guarantee all citizens their constitutional right to clean air and pure water.

Current Practices

Two recent documents identify the practices currently used by natural gas operators for the disposal of wastewater from the hydraulic fracturing process:

In September, 2010, the State Review of Oil and Natural Gas Environmental Regulations, Inc. (STRONGER) issued a report identifying four different ways for managing wastewater in Pennsylvania:

- Reuse to fracture additional wells.
- Inject into underground disposal wells
- Transport to out-of-state facilities
- Treat and discharge to surface water.[3]

According to the STRONGER report, the vast majority of flowback has been treated at centralized waste treatment plants and then discharged into surface waters with only a small percentage taken to disposal wells. Of Pennsylvania's seven Class II waste disposal wells, only one is a commercial well. The EPA specifically designates Class II disposal wells for the oil and gas industry and the commercial wells exist for the disposal of brine, fracking fluids, and drilling mud.

Because of increased levels of total dissolved solids in sources for public drinking water supplies, particularly in the Monongahela basin, Chapter 95 of the Clean Streams Law was modified in August 2010, effective January 2011. The original law had no provisions for limiting TDS discharges into Pennsylvania streams, but the new law establishes daily maximum standards for TDS, sulfate, chloride, barium, and strontium. The new standards are to be met by treated wastewater before it is discharged into the streams.[4]

Operators are increasingly reusing flowback to fracture other wells, STRONGER reported. It also indicates that DEP supports reuse of flowback and produced water for hydraulic fracturing:

> There are no additional permit requirements needed to re-use flowback water at another well site. The transportation of water, wastewater and recycled water by truck or by pipeline does not require a permit beyond those already established for stream crossings and waste transporters.[5]

Regarding wastewater from hydraulic fracturing, the only recommendation offered in the STRONGER report was that the DEP should create an opportunity for increased public comment during the water management planning process.

Governor Corbett's Marcellus Shale Advisory Committee Report said that drillers are complying with Governor Corbett's and Secretary Krancer's April 2011 request to stop taking wastewater to sewage treatment plants, which are not capable of removing total dissolved solids from the flowback. The DEP determines compliance by examining the driller's records. Further, the governor's commission argues that several drillers are using on-site treatment of wastewater and storing it for use in fracturing other wells at other drill sites. According to the governor's commission, impoundments for storing wastewater for future use at other sites are required to meet DEP standards, and those located "where a breach could threaten public safety require a stringent engineering review."[6]

3 *(p. 21) {The report is available at http://www.strongerinc.org/documents/PA%20HF%20Review%20Print%20Version.pdf}*

4 Schmid & Company report that there is little assurance of such provisions providing any protection to streams from gas development since there is a total lack of credible NPDES monitoring of wastewater discharged to streams at longwall coal mines. (Schmid & Company, Inc., Consulting Ecologists. 2010. Protection of water resources from longwall mining is needed in southwestern Pennsylvania. Prepared for the Citizens Coal Council. Media PA. 195 p. http://www.schmidco.com/Final%20Report%2026%20July%202010.pdf.) DEP recently restructured the administration of its oil and gas permitting to resemble that for bituminous coal and separate it from the environmental expertise present in regional offices. This bureaucratic change presages further reduction in the environmental oversight of shale gas production to the low level afforded coal mining in Pennsylvania.

5 DEP has proposed additional general permit requirements for cleaning up flowback water before transporting and storing it for reuse at another well site, but has not held any public hearings on this matter. The proposed standards are not clear. Transportation of water, wastewater and recycled water by truck or by pipeline does not require a permit beyond those already established for stream crossings, once return water has been reclassified as no longer residual waste ("dewasted").

6 If water pipelines are used to transport produced water, especially pipelines merely plopped above ground along streams and roads, they provide miles of opportunity for spilling such wastewater under high pressure. Current practice would suggest that there is no way for DEP to provide any engineering review whatever (let along "stringent" review) of such pipelines, because no information about them is solicited by permit applications or offered by applicants.

Best Practices

The Oil and Gas Accountability Project works with several entities trying to protect their interests from the impacts of oil and gas development. As part of that effort, OGAP filed a Freedom of Information Act Request with the EPA to secure Material Safety Data Sheets (MSDS) submitted by companies. One company is a primary supplier of chemicals used in hydraulic fracturing. Because the company's MSDS suggests treating many of those chemicals as hazardous waste, and because oil and gas development companies operating offshore already have developed non-toxic compounds for similar operations, OGAP suggests that the best option is to fracture the shale using sand and water with non-toxic additives. Additional details regarding OGAP and best practices information is available at http://www.earthworksaction.org/FracingDetails.cfm#BESTPRACTICES.

Governor's Commission Recommendations

The governor's commission acknowledges that Marcellus wastewater is a feature of natural gas extraction and processing that poses serious problems. They recognize that 750,000 gallons of polluted frackwater returns to the surface each time a well is fractured, and there's no good place to put it. The report acknowledges that "several comments expressed concern regarding the impact of the hydraulic fracturing process." Their response relied principally on the industry position, supported by DEP, that "no groundwater supplies have been negatively impacted from the hydraulic fracturing process," and that existing regulatory oversight will guard against spills or leaks. The report also argues that additional federal and state laws regulate the handling of flowback.

The governor's commission report makes no mention of the huge number of violations actually being reported by the Pennsylvania DEP. The Pennsylvania Land Trust Association (PALTA) in 2010 summarized DEP data:

- 1,435 violations of Marcellus gas well permits by 43 drillers over 30 months from 2008 through mid-2010, when more than 3,600 permits were issued.
- At least two thirds of the violations were likely to entail significant impacts, primarily on water resources.
- The 43 permitted drillers averaged from 0.8 to 11.0 violations per well.
- More than 370 violations were reported for faulty pollution prevention and wastewater containment, more than 150 violations for illegal discharge of industrial waste, and 54 violations for improper casings and faulty blowout controls.

The governor's commission seems to argue that existing legislation, regulatory activity, and due diligence by drillers minimizes the threat of frack fluids to public health and safety, so their recommendations on the issue are minimal:

> 9.2.7: Well operators should be required to track and report on the transporting, processing and treatment or disposal of wastewater from high-volume wells (i.e. 80,000 gallons or more of water used).
>
> 9.2.18: Over the next six months DEP should evaluate all of its regulatory programs to determine if obstacles exist or changes could be made to facilitate the increase in proper recycling of flow back and produced water from gas wells and to facilitate and encourage the increased use of non-fresh water for hydraulic fracturing.
>
> 9.2.21: The Oil & Gas Act should be amended to clarify that DEP has authority pursuant to the Clean Streams Law to require a Water Management Plan (Plan) as part of the Section 201 permitting process to protect the ecological health of water resources. Approval of a Plan shall authorize the removal and use of such water away from the riparian lands, provided the use is conducted in accordance with the Plan. An operator must still obtain legal permission from the riparian rights owner for access. Such program should not duplicate the authority of any interstate river basin commissions.
>
> 9.2.23: DEP and DCNR – along with industry – should continually review and examine the range of best management practices utilized during construction and operation of the well site, and consider incorporating these types of practices into regulatory and operator guidance.

The governor's commission largely ignored the issue of wastewater disposal despite widespread citizen concern about the potentially devastating effects of hydraulic fracturing. Specifically not addressed is the storage and treatment of wastewater in open pits. Even though some companies have advertised their abandonment of this practice because pit liners are inclined to leak, causing unnecessary damage to streams, vegetation, livestock, and wildlife, there was no suggestion that all

companies should be required to do so.

Another predominant citizen concern that was not addressed focused on the industry's claim that fracking wastewater has never damaged drinking water. When Pennsylvanians observe that oil and gas producers provide water to some households but require sealed, out-of-court settlements that hide culpability, they are naturally skeptical. The Governor's commission might have recommended a practice similar to that required of mine operators who must secure a number of water tests throughout the area of a mining operation before a permit is issued.

Citizens Commission recommendations

-Companies involved in extraction of natural gas from all shale deposits in Pennsylvania should be required to eliminate the use of toxic chemicals in all hydraulic fracturing operations.

-All produced water (frackwater, wastewater and flowback) should be stored in closed tanks prior to offsite disposal, well pads should be impervious, and the tanks should be surrounded by secondary confinement to capture any spillage.

- Signage and placards that allow the public to differentiate freshwater trucks from flow backwater trucks must be clear and visible from a distance. Truck colors and hose colors could also vary.

-Drilling companies should be required to test, at the companies expense, all individual water supplies for chemicals and minerals typical of drilling operations within 3000 feet, similar to the requirement for coal mining, of any proposed natural gas well. The tests must be completed by certified state laboratories and residents informed of the results prior to any excavation in preparation for drilling.

-Produced water that cannot be reused or injected into appropriate disposal wells must be submitted to treatment facilities capable of removing chemicals and TDS to current Chapter 95 standards before being returned to rivers and streams. If such facilities do not exist in numbers sufficient for anticipated volumes, then they must be constructed at the industry's expense.

-Re-use disposal of wastewater for dust control, de-icing or other purposes that threaten surface resources should be banned.

- Tracers and tracer dyes should be required at the wellhead to facilitate identification of the source of water contamination and spills. The content of the tracers should be reported to the DEP and published on the website. Split water samples should be taken at all drill sites, with both DEP and the company maintaining a share of the sample, to facilitate swift identification of contamination sources.

Issue Exploration: Air Pollution

The heart of the matter: More than 6,000 permits for Marcellus Shale gas wells have been approved during the past two years. These permits have been issued without the requirements for tight air pollution controls. Air pollution can be released during production, processing, transmission and storage, and distribution. Fugitive, vented, and combusted emissions from these stages can be significant. Measures can be taken to reduce air pollution and protect the public health.

Citizens Commission Findings

Currently, fugitive emissions of methane from the natural gas industry are not regulated by DEP. Flaring during completion of wells is the most obvious and visible source of air pollution from gas wells. A large number of pollutants are released into the air during the flaring process, including nitrogen oxides (NOx), volatile organic compounds (VOCs), carbon monoxide (CO), and a number of hazardous air pollutants (HAPs) making it an undesirable practice. Airborne pollutants include the following: acetaldehyde, acrolein, benzene, ethyl benzene, formaldehyde, hexane, naphthalene, propylene, toluene, and xylenes. Flaring can be seen for miles around the well pad, and the noise, odor, and pollutants released from flaring are very disturbing to nearby residents.

Many of these emissions are not visible. Equipment leaks can come from valves, pump seals, flanges, compressor seals, pressure relief valves, open-ended lines, and other process and operation components. The amount of pollutant emissions from equipment leaks depends on the type and number of equipment components and the leak rate of those components.

Compressor engines are also a significant source of fugitive, vented, and combustion emissions. During combustion, these engines release significant quantities of NOx, VOCs, CO, and formaldehyde. During normal operations, unburned methane is also emitted in the engine exhaust, and fugitive emissions can result from leaks in valves and pressurized connections. Natural gas is vented during engine start-ups if natural gas is used to power the starter turbine. During upsets, natural gas is released from compressor blowdown and pressure relief valves. Natural gas is intentionally vented during compressor blowdown for maintenance. The Citizens Commission has heard from the public about the ill effects experienced where compressor stations are sited very close, within hundreds of feet, to residences.[1]

Hazardous air pollutants including formaldehyde, ethylene glycol, mixed xylenes, n-hexane, benzene, toluene and ethyl benzene may be emitted at various natural gas production facilities. At present, only stationary compressor engines over 100 horsepower and facilities which emit at least 10 tons per year of a single HAP or 25 tons of HAP emissions are subject to DEP source permits.

Dehydrators and condensate tanks are sources of hazardous air pollutant emissions. Ethylene glycol is also emitted from gas dehydration operations at compressor stations. VOC and BTEX emissions may also be released from the condensate tanks. Dehydrators and condensate tanks are installed permanently on the well pad site after drilling and fracking operations are complete. The Citizens Commission visited sites where these facilities were mere hundreds of feet from residences. The residents and children are subject to long-term exposure to hazardous air pollutants from the installations, even if the level of hazardous air pollutant emissions is low.[2]

Children are more vulnerable to environmental hazards. They eat, drink, and breathe more than adults on a pound for pound basis. Research has also shown that children are not able to metabolize some toxicants as well as adults due to immature detoxification processes.[3]

The Citizens Commission heard from health professionals, including the former heath commissioner for the city of Philadelphia, on the air pollution health

1 Testimony of Pam Judy, Aug. 31, 2011.
2 Comment of Dr. Helen Bitaxis, Moon Township, August 31, 2011
3 Pediatric Environmental Health Specialty Units Information on Natural Gas Extraction and Hydraulic Fracturing for Health Professionals.

health effects from drilling activities. Increases in particulate matter air pollution, for example, have been linked to respiratory illnesses, wheezing in infants, cardiovascular events, and premature death, according to studies cited by citizens.[4] Since each fracturing event at each well requires up to 2,400 industrial truck trips, residents near the site and along the truck routes may be exposed to increased levels of these air pollutants. Benzene exposure during pregnancy has been associated with neural tube defects,[5] decreased birth parameters,[6] and childhood leukemia.[7]

Current Practices

More than 6,000 permits for Marcellus Shale gas wells have been approved during the past two years. These permits have been issued without the requirements for tight air pollution controls. Air pollution can be released during production, processing, transmission and storage, and distribution. Fugitive, vented, and combusted emissions from these stages can be significant.

Most knowledgeable observers, including the Governor's Marcellus Shale Advisory Commission, recognize that air pollutants are being emitted from gas well drilling, transportation, production, refining, and storage activities. The pollutants being emitted include nitrogen oxides (NOx), carbon monoxide (CO), hazardous air pollutants (HAP) such as benzene, and toluene, other volatile organic compounds (VOC), and particulate matter. Radionuclides such as radium, thorium, and radon from the wastewater treatment of fluids, malodors, and methane are additional sources of air pollution. Finally, releases of methane as fugitive emissions through leaks from processing equipment and pneumatic devices and from venting and flaring can cause air pollution problems.[8]

The Pennsylvania Department of Environmental Protection conducted three short-term studies of air pollution from gas production operations.[9] Among its key findings are:

- "Short-term sampling did detect concentrations of certain natural gas constituents including methane, ethane and propane, and associated compounds such as benzene, in the air near Marcellus Shale drilling operations."
- "Most of the compounds were detected during short-term sampling at two compressor stations in Greene and Washington counties."

Performing short-term studies only provides a starting point for further studies. As stated in the DEP studies, DEP was not able to "determine at this time whether the potential cumulative emissions of criteria pollutants from natural gas exploration activities will result in violations of the health and welfare-based federal standards." To date, no study of the effect of these cumulative emissions has been performed by DEP, and DEP has not announced the commencement of such a study.

Best Practices

On August 23, 2011, the US Environmental Protection Agency published proposed new rules for reducing air pollution from the oil and gas industry. EPA's rules would require reduced emission completion, or green completion, for new hydraulically fractured and refractured wells. These techniques reduce VOCs, HAP, methane, NOx and CO emissions. EPA has been taking a hard look across the entire oil and gas sector, including all the various operations segments related to the production and transportation of oil and gas, to identify sources of air pollution emissions, quantify those emissions, consider how those emissions could best be reduced, whether by end-of pipe controls or process changes, consider the environmental and economic effects of any proposed emissions reductions.

Based on this review, EPA proposed new rules to control two kinds of pollutants: conventional pollutants, such as nitrogen oxides, particulate matter, sulfur oxides, and volatile organic compounds, and hazardous air pollutants, such as benzene and toluene.

Traditionally, flaring was performed at well heads to remove waste gas or to relieve gas pressure deemed too high while lowering the risk of uncontrolled fires or explosions. Today, flaring is not necessary, is wasteful, and is technically obsolete, as well as being a health hazard to nearby residents.

4 Laden F, et al, Lewtas J, Ryan PH, et al, Sacks JD, et al.
5 Slama R, et al, 2009.
6 Slama R, et al, 2009.
7 Whitworth KW, et al, 2008.
8 MSAC report at 76.
9 MSAC report at 76.

Green completion of wells has been in widespread use throughout the gas industry. (http://www.encana.com/operations/activities/npl/docs/npl-fact-sheet.pdf) EPA has proposed operational standards for well completion, which would require reduced emission completions, also known as green completions. EQT, a Pennsylvania gas producer and distributor, is already implementing this practice in Pennsylvania. Green completion, where feasible, should be the industry standard in Pennsylvania.

EPA also is considering reduced emissions from gas-driven pneumatic devices. Additional emission reductions will occur at compressor engines. For fugitive emissions of VOCs and hazardous air pollutants, EPA is proposing operational changes, including leak detection, which would achieve a 95 percent emission reduction. EPA's rules are the subject of public comment through October 31, 2011.

The Shale Gas Subcommittee of the U.S. Secretary of Energy Advisory Board is charged with identifying measures that can be taken to reduce the environmental impact and improve the safety of shale gas production. On August 18, 2011, it issued a 90-day interim report. One of the subcommittee's recommendations was to improve air quality:

> Measures should be taken to reduce emissions of air pollutants, ozone precursors, and methane as quickly as practicable. The Subcommittee supports adoption of rigorous standards for new and existing sources of methane, air toxics, ozone precursors and other air pollutants from shale gas operations.

When pressed to implement best practices on sensitive federal lands, one company informed the public it could reduce gathering system pressure, convert drill rig engines from diesel to natural gas fuel, install Selective Catalytic Oxidation (SCO) emission control devices on natural gas drill rig engines, implement flareless flowback green well completion techniques, implement enhanced directed inspection and maintenance program to reduce VOC emissions from equipment, install remote telemetry process equipment monitoring, and collect all gas, water and condensate in a closed-loop three-phase gathering system.

Governor's Commission Recommendations

The Governor's Marcellus Shale Advisory Commission made no recommendations for additional control of air pollution from gas development activities and made no recommendation to study air quality associated with gas drilling.

Citizens Commission Recommendations: Air Pollution

The Citizens Commission finds that the gas industry has the ability to take significant steps to identify and reduce emissions in Pennsylvania. The commission heard from Pennsylvania citizens who live near gas wells and production facilities that the emissions are noxious.

The General Assembly and DEP can implement measures to reduce air pollution and protect the public health:

-The DEP should conduct baseline background monitoring in non-drilling areas as well as long-term ambient monitoring for NOx, particulates, Volatile Organic Compounds (VOCS), methane and ozone air quality at permanent stations in any area where the well and/or compressor engine density exceeds 10 wells per square mile.

-The DEP, municipal police, and Pennsylvania State Police should enforce the Diesel Powered Motor Vehicle Idling Act (35 P.S. § 4601) at all well pads, staging areas, and water withdrawal sites.

-Pennsylvania should implement best practices and best available technology immediately, (including the proposed EPA standards) and enforce them at all well sites and related production, refining, compression and transportation facilities.

-To address on-site emissions from engines and compressors Pennsylvania should prohibit uncertified (i.e., EPA Tier 0) diesel-powered drilling or hydraulic fracturing engines for any activity at the well sites. Drilling engines and drilling air compressors should be limited to EPA Tier 2 or newer equipment, equipped with diesel particulate filters. (NY mitigation measure).

-All operators should implement a program of leak detection and repair and reduced butane toluene ethylene and xylene (BTEX) emissions at storage tanks and small glycol dehydrators. (EPA proposed standard).

-All operators should enclose and install sound insulation at compressor stations; adopt mitigation procedures for startup, shutdown, and malfunction at compressor stations; and notify nearby residents of such incidents.

-DEP should aggregate all completion, production, and transmission activities located at facilities connected to any compressor station for review as a single source of air pollution.

-Open wastewater and solid waste impoundments should be prohibited and full utilization of closed-loop water and waste systems should be required.


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Issue Exploration: Marcellus Shale & Our Public Lands

The heart of the matter: While the Marcellus Shale has been touted for its ability to stimulate Pennsylvania's economy, it will also have a strong negative impact on state parks, state forests, and the tourism and timber industries that depend on responsible stewardship of our public resources. All must be protected, and the cumulative impact of well permits considered.

State Forest and Park Management: A Primer

More than 100 years ago, the forests of Pennsylvania were virtually clear cut, exhausting our supply of timber and turning huge swaths of Pennsylvania into barren wastelands. To make sure this would never happen again, Pennsylvania leaders formed what was then called the Forestry Commission. Over the next century, the Commonwealth purchased 2.2 million acres of land to maintain a supply of high-quality, properly managed timber and to provide and protect outdoor recreational activities for citizens. Today, these internationally recognized public resources are managed by the Department of Conservation and Natural Resources (DCNR).

The Bureau of Forestry, charged with ensuring the long-term health, viability, and productivity of the Commonwealth's forests and conserving native wild plants, manages state lands.[1] The bureau manages the state forest to retain its wild character and provide opportunities for low-density recreation and habitat protection, and to assure environmentally sound utilization of mineral resources.

The bureau is also responsible for protecting forestlands, public and private, from damage and destruction by fires, insects, diseases, and other agents.

DCNR's mission is challenged by the rapidly growing heavy industrial activity of deep well gas extraction on public lands. While the Marcellus Shale has been touted for its ability to stimulate Pennsylvania's economy, it will also have a very negative impact on our state forests and the tourism and timber industries that depend on responsible stewardship of our public resources. These forest-linked industries, and the jobs they create, could be terribly affected by additional large-scale leasing of state forests.

Citizens Commission Findings

Time and again throughout the Commission hearings, citizens quoted Article I, Section 27, of the Pennsylvania Constitution: "T*he people have a right to clean air, pure water, and to the preservation of the natural, scenic, historic and esthetic values of the environment. Pennsylvania's public natural resources are the common property of all the people, including generations yet to come. As trustee of these resources, the Commonwealth shall conserve and maintain them for the benefit of all the people.*"

Our state forests are certified by the Forest Stewardship Council™ (FSC), an independent organization supporting environmentally appropriate, socially beneficial, and economically viable management of the world's forest. FSC certification brings along with it a high value/high dollar designation for our timber products. Excessive leasing and over-drilling in our public lands could seriously jeopardize future certification.

Pennsylvania's state forests are the first and longest-certified public forest system in the nation. For more than a decade, DCNR has met or exceeded the international gold standard for environmentally and socially responsible forestry. DCNR has been able to sustainably harvest timber while maintaining forest ecosystems and balancing mineral extraction, financial, and even socioeconomic considerations.

Of the 1.5 million acres of state forest land over the Marcellus, 700,000 are available for leasing. The FSC certification standards are unambiguous about public lands and the consideration of non-forest activities, such as hunting, fishing, other outdoor recreation and tourism. Forest managers are clearly instructed that "an economically viable forest management means that forest operations are structured and managed as to be sufficiently profitable, without generating financial

1 DCNR website

profit at the EXPENSE (emphasis added) of the forest resource, the ecosystem, or affected communities." [2]

The timber industry is very important to Pennsylvania's economy, responsible for 90,000 employees representing one in 10 manufacturing jobs. Pennsylvania is the largest producer of hardwoods in the country, accounting for a full 10 percent of total U.S. hardwood output and much of the world's supply of high-quality black cherry. This is due in no small part to our 2.2 million acres of FSC-certified state forest land.

In a recent poll, 72 percent of Pennsylvanians – nearly three out of four -- said they oppose opening more of the state's forest land to drilling.[3]

Many citizens living in and around the state forests being drilled told the Commission about the negative impacts in their communities: Hikers, mountain bikers, hunters, and other recreation users denied access to publicly owned state forests by the drilling industry's private security personnel. State forest roads closed off on leased land. The public is being denied access to large portions of their lands because of drilling.

DCNR admits that "recreational uses of the forest can be impacted by increased truck traffic, noise and the visual impact of drilling equipment, site lighting and well flares burning off excess gases. The potential for hazards to health and safety and issues of waste products and hazardous materials must all be addressed."[4]

Risking our forest certification and non-forest related activities, including hunting, fishing, and tourism, through further leasing in order to balance the Commonwealth's budget directly conflicts with DCNR's mission. A 2010 DCNR study concluded that any additional leasing involving surface disturbance unavoidably upsets the sustainable balance that DCNR is charged to maintain.[57]

2 Certification Standards DCNR's web site page 19 of 109http://www.dcnr.state.pa.us/ucmprd1/groups/public/documents/document/dcnr_007038.pdf

3 Franklin and Marshall Poll 9-01-11 https://edisk.fandm.edu/FLI/keystone/pdf/keyaug11_1.pdf

4 DCNR 'Managing the Effects of Natural Gas Development' http://www.dcnr.state.pa.us/forestry/naturalgasexploration/impacts/index.htm

5 Impacts of Leasing Additional State Forest for Natural Gas Development http://www.dcnr.state.pa.us/ucmprd2/groups/public/documents/document/d_000603.pdf

Forest Fragmentation and Impact on Headwaters

Additional leasing will cause serious forest fragmentation, threatening forest certification and its overall health and aesthetic appearance. Numerous well pads with their interconnecting gathering lines, roads, compressors stations, and transmission lines will cause permanent loss of forest canopy and significant fragmentation of our state forests.

Often overlooked is the role that our large expanse of forest cover plays in maintaining high-quality headwaters. Loss of the expanse will result in warming headwaters, especially in those that are now cold-water fisheries.

This image of gas well sites at 40-acre intervals in the Wyoming Jonah basin shows the stark possibilities.[6]

From 6,000 to 12,000 wells are projected for current leasing on state forest/public lands. Currently, the industry averages about three wells per pad, meaning between 2,000 and 4,000 well pads will be drilled on state forest lands. According to a recent report, well pads occupy an average of 3.1 acres, while associated infrastructure such as roads, water impoundments, and pipelines takes another 5.7 acres, for a total of nearly 9 acres per well pad. Even adjacent areas that aren't cleared can be impacted, most notably in settings where clearings fragment contiguous forest patches, create new edges, and change habitat conditions for sensitive wildlife and plant species that depend on interior forest

6 West Virginia Surface Owners Rights Organization http://www.wvsoro.org/resources/marcellus/horiz_drilling.html

conditions. Indirect forest impact from new edges is estimated at 21.2 acres per well pad for a combined impact of 30 acres of cleared and impacted forest per well pad. [7]

Using these estimates, current leasing will clear 17,600 to 35,200 acres of state forest land – an astonishing 27.5 to 55 square miles of public land deforested and 93.75 to 187.5 square miles cleared or impacted. If more state forest acreage is leased, these figures will increase.

The resulting earth disturbance and compaction will cause significant sediment loading of forest headwaters. These impacts will no doubt have a considerable negative effect on native brook trout populations and water quality downstream. Brook trout populations are very sensitive to developmental pressures and sedimentation load in particular. According to the Nature Conservancy, "native brook trout are one of the most sensitive aquatic species in Pennsylvania watersheds. . . . Once widely distributed across Pennsylvania, healthy populations have retreated to a shrinking number of small watersheds. Many of these watersheds overlap with the Marcellus shale formation. A large majority (113) of the 138 intact or predicted intact native brook trout watersheds in Pennsylvania are projected to see at least some Marcellus gas development."[8]

Expansion of current shale gas development would severely diminish the fishing opportunities in these headwaters and degrade water quality downstream.

An equally serious concern is the impact that increased sediment loads poses to other downstream industries and those already permitted to discharge into the waterways. Other construction-related industries, loggers, and developers could see a negative impact and limitations or even denials of their individual permits. This concern requires cumulative impact analysis by DEP for each major watershed.

Tourism and Timbering Economies at Risk

A high level of dispersed forest industrialization will also affect the tourism industry, especially in the northern tier.

Tourism is a significant driver in Pennsylvania's economy, second only to agriculture. It supports the jobs of more than 433,000 Pennsylvanians with a total economic impact of $32.9 billion.[9]

The Pennsylvania Wilds and Endless Mountain regions are in the heart of the Marcellus formation and have become very popular destinations for vacationers. In recent years, the Commonwealth has invested hundreds of millions of dollars in the PA Wilds region, trying to expand tourism-related economies. These efforts have been hugely successful and are being put at risk as the forest's secluded outdoor character is altered by widespread industrialization.

The biggest draw for tourists is the huge expanse of uninterrupted public forestland. An industrial grid would degrade the expected outdoor experience and deteriorate the solitude of the wilds with heavy industrial activity. These factors combined with the lack of hotel space caused by out of state industry workers could cause devastating and long-lasting impact on the tourism industry.

While jobs related to the natural gas boom economy are short term, those related to the tourism and timber industries are sustainable jobs that provide economic opportunity for our citizens and long-term stability for their communities.

State Parks

Pennsylvania's 117 State Parks are precious public treasures, and 61 lie atop the Marcellus formation. They feature breathtaking natural vistas, provide opportunities for healthy outdoor recreation, and serve as outdoor classrooms for environmental education. They also play an integral part in the state's economic vitality and quality of life. Every dollar the Commonwealth invests in state parks returns nearly $10 to local economies. State parks generate more than $818 million in local sales and support more than 10,500 jobs.

The viability of our state park system is extremely sensitive to the environmental and recreational conflicts of heavy industrial activity associated with gas development. DCNR does not currently lease state park

7 Pennsylvania Energy Impacts; Nature Conservancy pg 10 http://www.nature.org/media/pa/tnc_energy_analysis.pdf

8 Pennsylvania Energy Impacts; Nature Conservancy pg 23 http://www.nature.org/media/pa/tnc_energy_analysis.pdf

9 PA Tourism=Jobs http://www.patourismequalsjobs.com/

land for gas exploration, but the Commonwealth does not own the mineral rights beneath 80 percent of state park land.

Under Pennsylvania law, owners of those minerals have the unquestioned right to develop their property. There has been some relatively minor gas and oil exploration in some parks over time, but the advent of horizontal drilling technology and Pennsylvania's Marcellus gas boom have increased the value of those subsurface rights and make the threat of drilling in our state parks immediate and widespread.

The prospect of the tranquility and solitude of these refuges being shattered by surrounding truck traffic, heavy equipment, drilling, compressor stations, and overall heavy industrial activity is appalling. Drilling in these areas would not be in the best interests of the industry or the citizens of Pennsylvania.

The nature of horizontal drilling technology would allow the mineral rights that exist beneath park land to be accessed from outside their boundaries, leaving them free from disturbance.

Neighboring West Virginia (which owns a little more than half the mineral rights beneath its parks) prohibits disturbing the surface of state parks for gas drilling. New York has just recently proposed such a prohibition. Pennsylvania should follow suit and enact a similar ban.

Cumulative Impacts

Many witnesses told the Commission that Commonwealth policymakers and environmental regulators must consider the cumulative impact of well sites, pipe lines, roads, and related construction activity on the state forest system. While sedimentation, forest fragmentation, loss of habitat, and impact on recreational users for the permitting of an individual well may not raise concerns, the cumulative impact of hundreds or thousands of permits on public land takes on a whole new dimension.
The cumulative environmental and visual impacts of this type of development in our public lands at the scale currently anticipated would forever change the face of our state forest system and the mission of DCNR.

For more than a century, Pennsylvania leaders have been wise to preserve large tracts of Penn's Woods. As former Secretary John Quigley said in his testimony before the Citizens Commission on Marcellus Shale: "Our public lands define the Pennsylvania that we love. They clean our air, filter our water and provide hunting, fishing, myriad outdoor recreation opportunities, solace and spectacular natural vistas. They support our economy – and our spirits. We are obligated to conserve them. What will we leave to our children and grandchildren?"

Citizens Commission Recommendations

-The commonwealth should extend the current moratorium on new gas leasing in state forests, and implement a moratorium on state game lands until there an appropriate assessment of impacts of drilling.

-Require a stream analysis within 500 feet of a well pad and in the corridor of any related facility a as part of the well drilling application process to DEP. A similar analysis is already required for long-wall and strip mining permit applications.

-As other states have done, Pennsylvania must enact legislation that will not allow surface disturbance on state park lands in order to protect this critical resource.

-The Pennsylvania Department of Conservation and Natural Resources (DCNR) should undertake an analysis of the cumulative impact of natural gas production on public lands as required under the current moratorium, taking into consideration well pad spacing, the location and number of gathering and transmission lines, roads, compressor stations and associated gas infrastructure development. The analysis should consider the impact on recreational use of public lands and the impact of drilling on the timber and tourism industries.

- DCNR has established strong requirements for drilling in state lands including developing and encouraging the use of best management practices. DCNR's practices should serve as a model for drilling on non-state lands.

-DEP must consult with the Pennsylvania Fish and Boat Commission before permitting gas well or infrastructure development in the vicinity of high quality headwaters, wild and wilderness trout streams, High Quality or Exceptional Value waters and wetlands associated with them and condition permits to minimize impact.

-The Commonwealth should specify areas where drilling is prohibited, including high quality and exceptional value streams, wetlands and floodplains.

Issue Exploration: Regulations Governing Natural Gas Drilling in Pennsylvania

The heart of the matter: Many citizens feel that they are not being protected from the various adverse effects of shale gas development by elected officials or by regulatory agencies focused on the prospect of short term employment and financial benefits. Laws implementing constitutional protections are not being enforced effectively by agencies slow to respond to the technology and scale of gas development that threatens the health and environment of this and future generations. Recent trends appear headed in the wrong direction as this heavy industry spreads across the landscape of the Commonwealth. Regulators are missing the opportunity to head off damages before they occur, leaving the public only with whatever compensation they can secure from the courts after damages take place.

Citizen Commission Findings

Drilling in Pennsylvania has been regulated since 1956, but half a century of regulating conventional extraction of natural gas has not prepared Pennsylvania to control the shale gas boom of the twenty-first century so as to minimize its adverse effects. Huge numbers of deep, horizontal wells that employ high-pressure, slickwater hydraulic fracturing to release gas from shale are new technologies, whose impacts on Pennsylvania geologic and environmental conditions are not well understood. These wells are accompanied by the attendant effects of access roads, pipelines, and pollutant emissions to water, air, and land on an unprecedented industrial scale. Oil and gas exploration and drilling on paper are regulated under all or part of the state oil and gas laws, the Clean Streams law, the Dam Safety and Encroachments Act, the Solid Waste Management Act, the Water Resources Planning Act, and the Worker and Community Right to Know Act. The Governor's Marcellus Shale Commission report lists 50 Pennsylvania laws, 48 sections of regulations in the Pennsylvania Code, and 57 Technical Guidance Documents that bear on gas development, along with 16 federal laws and 19 sections of the Code of Federal Regulations. On state-owned lands, the DCNR has considerable influence over the planning and conduct of oil and gas activities.

Yet there are major gaps in this regulatory patchwork when actual shale gas development takes place in Pennsylvania forests, farmlands, and residential neighborhoods. Air pollution by the industry goes virtually unregulated. Residential and agricultural water supplies are destroyed. The application of existing laws to specific developments is fragmented and ineffective, leaving affected residents with the sense that they have nowhere to turn. New legislation could bolster the ability of regulators to gain effectiveness, but the primary lack is the political will to use existing authority to plan and monitor the major expansion of industrial activity occasioned by shale gas development. Information regarding planned development is not readily available to the public. Few municipalities have begun to use their limited police and zoning powers over shale gas development in efforts to protect residents more effectively than state and federal agencies.

Current Practices

The Pennsylvania Department of Environmental Protection is responsible for reviewing and issuing drilling permits, processing permits for encroachments into streams and wetlands, inspecting drilling operations, and responding to complaints about water quality problems. DEP inspectors make unannounced visits to drill sites and wells. Yet DEP's budget and staff have sustained major cuts in recent years even as industrial activities have snowballed. Oil and gas permitting recently has been centralized, isolating permit review from the scientific expertise resident in DEP's regional offices. Other agencies directly responsible for monitoring the effects of shale gas development include the Pennsylvania Fish and Boat Commission, the Susquehanna and Delaware River Basin Commissions, the U.S. Fish and Wildlife Service, and (formerly) Pennsylvania's county conservation districts. Most notably, the Delaware River Basin Commission has imposed a moratorium on all shale gas

development within its jurisdiction pending adoption of completely new regulations addressing this industry. Public scrutiny of its proposed rules has been intense.

Numerous permits and approvals are required when a gas well is brought into production, but there is minimal coordination among those approvals, much less consideration for the cumulative effects of multiple well developed within individual watersheds or municipalities. Minimal data are requested in the current 2-page application, making it impossible for DEP to exercise its existing authority to protect resources under Section 205(c) of the Oil and Gas Act. Drilling companies are not required to identify where they plan to obtain and store water and where the used frack water is to be treated as part of the well permit application process. Roads and pipelines are not mentioned when well approvals are requested, although gas cannot be produced or marketed in the absence of such infrastructure. Similarly, the supporting infrastructure or gathering lines and well pads is ignored when major transmission pipelines are installed. Minimal information is requested from drillers concerning how wells are to be cased. As a result of drilling for oil and gas since 1859, Pennsylvania has a significant number of abandoned, orphaned wells that have not been plugged and could serve as pathways for groundwater contamination, but these are not identified in new well permit applications.

Erosion and sediment control plans are required for any earth disturbance activities, but no agency review may be performed. Earth disturbances of more than five acres require a DEP permit, yet many drilling permit applications fall under the five-acre threshold. Most large well pads garner routine approval after minimal review under General Permit 1, which is noticed in the Pa. Bulletin. County conservation districts until recently had primary responsibility for controlling soil erosion and sedimentation, but no longer supply their local expertise in overseeing gas construction. Best Management Practices for gas development are remarkably less strict than for virtually every other type of construction in Pennsylvania. Gravel roads are considered a best practice, rather than a construction activity to be regulated.

Long-term impacts, as discussed elsewhere in this report, are seldom considered. The DEP, in cooperation with the Susquehanna and Delaware River Basin commissions, has developed permit guidelines for water usage and disposal which are used in reviewing applications from areas of the state outside the purview of those interstate agencies. But there is great concern remaining for the effectiveness of long-term water management, given the legal fiction in Pennsylvania that surface waters and groundwaters are not intimately related.

Pennsylvania requires drillers to case and grout wells drilled through freshwater aquifers before drilling into deeper zones. The goal is to protect groundwater from well pollutants and keep surface water and water and other substances from other geologic strata from polluting the groundwater. Currently, three layers of casing are required. But technological innovation has bypassed regulatory requirements. At least one large company is now using five layers of casing to protect against ground water contamination. Many instances of contamination of water wells with methane and other contaminants have resulted from faulty casing application and sub-standard cement.

Drilling wastes frequently are stored in pits with synthetic liners, which often have leaked and caused pollution. Such pits always pose a nuisance and source of uncontrolled air pollution. There is no requirement to store in a closed-loop system to contain the fluids. Recently gas companies voluntarily ceased disposing their waste fluids at publicly owned water treatment facilities incapable of adequate treatment. Some companies reuse the wastewater together with freshwater, and others dispose of their wastewater at injection wells, chiefly in Ohio. DEP currently is revising its general permits regulating gas well cuttings and return water as residual wastes.

Wells cannot be drilled within 200 feet of structures unless the structure owner signs a waiver. Wells and roads are not supposed to be built within 100 feet of streams and wetlands unless DEP grants routinely requested and approved waivers, but sites seldom are inspected prior to construction, and DEP fails to require formally approved Jurisdictional Determinations showing the limits of streams and wetlands as part of permit applications. This results in unnecessary and avoidable enforcement against unauthorized fills and encroachments. The locations of wells, access roads, and other drilling operations on private lands may be negotiated in the lease agreement by informed mineral

owners who understand the implications of selling mineral interests. Property owners who do not own the gas rights may seek to negotiate the location of surface construction activities in a lease agreement but do not have the same leverage as the owner of both the gas rights and the property.

Across the board of shale gas permits, data on the existing condition of affected resources are not being collected, impacts are not credibly anticipated, permit approval is not transparent or sensitive to public concerns, and monitoring of environmental consequences is virtually nonexistent. Procedural requirements designed to minimize impacts are often quietly waived or sidestepped in practice when approvals are hastily granted. Attained use designations of affected streams, required by regulation for every DEP permit affecting watercourses, seldom are made, despite the fact that many forested streams have not been studies and thus their existing quality cannot be identified or protected. Recognized Special Protection (Exceptional Value and High Quality) waters often get no more review than that accorded less sensitive waterways, despite the fact that the impacts of shale gas development appear to be irreversible.

The public is not well informed regarding plans for gas development. Adjacent landowners and municipalities receive some notice during the processing of various permits. Formal notices in the Pennsylvania Bulletin contain little information, but are available online. Well drilling permits are not noticed at all, nor are many waivered activities and general permits for stream encroachments. DEP has not coordinated the notices provided online by its E-NOTICE system with those in the Bulletin. The substance of proposed developments can be examined only by appointment in regional offices, not online. Reports detailing violations and their resolution also must be examined by appointment.

A drilling company can be held responsible for damages to a private water supply at any time after drilling, but enforcement of company liability can be quite difficult to obtain for those affected. Within six months after drilling has occurred, the gas well drilling company is presumed responsible for any water quality impact to water supplies within 1,000 feet of a gas well. To escape liability, they must provide evidence to rebut the presumption that they did not cause the problem. Any damages to water supplies within 1,000 feet of the gas well that occur more than six months after drilling, however, have to be proven by the water supply owner and DEP. The burden of proof for water quality or supply damage always lies with the water supply owner and DEP. The entire burden of proof for any water quality or quantity problem beyond 1,000 feet from the gas well site, where there is no rebuttable presumption, always falls on the affected party.

Governor's Marcellus Commission Findings

The Governor's Commission included significant recommendations for strengthening the regulation and permitting of shale gas development, particularly the 43 recommendations in its Chapter 9.2 that were listed as follows:

1. Increase penalties for violations
2. Amend Oil & Gas Act to give DEP civil penalty authority as in other environmental laws
3. Authorize Environmental Quality Board to adopt regulations for conditioning well permits
4. Increase DEP authority to compel compliance and correct violations
5. Extend permittee notice to landowners, water purveyors, host and adjacent municipalities within 2,500' (now 1,000')
6. Extend presumed permittee liability for water well damage to 2,500' (from 1,000') and to 12 months (from 6 months) after initial fracking and after subsequent additional fracking
7. Require permittees to track and report wastewater disposal
8. Create well operation permit to govern adoption and treatment of orphan/abandoned wells
9. Increase performance bond amounts
10. Increase DEP emergency response and cost recovery authority
11. Extend minimum setback of gas well to 500' (from 200') from private water supply well and to 1,000' from public water well, intake, or reservoir unless waived by operator
12. Increase DEP authority to regulated hazardous materials in floodplains
13. Allow DEP to condition or prohibit gas wells in floodplains
14. Require reporting of well chemicals, fracking reports, and drilling logs to DEP with posting online for public access
15. Increase DEP site inspections at critical points during well construction

16. Place DEP well inspection reports describing violations and resolutions online
17. Enact new standards for the 20,000 private water wells drilled annually in Pennsylvania
18. Encourage recycling of flowback water and use of non-fresh water for fracking
19. Encourage industry to improve watersheds, streams, and forest habitats to mitigate future resource damages
20. Allow DEP discretion conditionally to increase the time allowed for gas well remediation and site restoration (from current 9 to 15 months)
21. Amend Oil & Gas Act to specifically recognize DEP authority to require Water Management Plans for gas wells
22. Encourage use of non-fresh water for fracking
23. DEP and DCNR should continually review Best Management Practices (21 examples listed)
24. Increase setback to 300' (from 100' now in Oil & Gas Act) from well bore to stream or waterbody and 100' from edge of disturbance; retain waiver authority but authorize DEP to increase setback or require BMPs for Exceptional Value and High Quality streams
25. DEP should continue to participate in STRONGER reviews
26. DEP should increase protection of high ecological value areas through permit conditions
27. DEP should undertake engineering analysis of spill containment effectiveness
28. DEP should improve permit review to protect rare, endangered, and threatened species with additional staff and technical resources
29. DEP should provide environmental checklist for permittees to use when siting gas facilities
30. Measures should be adopted to minimize invasive plant introductions
31. Other agencies should use expertise of DCNR in management of gas activities
32. DEP should monitor impacts of gas development
33. Increase flow of information and communications among all engaged in or affected by shale gas development
34. Establish an advisory committee to increase communication regarding gas impacts on State Parks and State Forests
35. Identify legislative changes needed to coordinate pipeline siting and sharing
36. Limit leasing of State Forest lands that could result in more than minimal impacts; allow no destruction in high value, ecologically important areas
37. Department of Health should establish registry and curriculum on protection from gas impacts
38. Department of Health should collect data from clinical sources on gas impacts
39. Department of Health should review and evaluate data on gas impacts to health
40. Department of Health should establish registry of individuals with health affected by gas
41. Department of Health should establish a system to collect, investigate, and respond to health complaints from citizens and public officials
42. Department of Health should educate care providers on illness from drilling constituents
43. Department of Health should sponsor public education on protecting against gas impacts

The Governor's commission also recommended (9.2.1) one-stop permitting for gas development, increased reliance on general permits, and a greater role for the Public Utility Commission in strengthening pipeline safety requirements.

The Governor's commission notably did not recommend the restoration of authority to county conservation districts for review and enforcement of erosion and sediment control. We believe that conservation district authority should be restored and increased, to relieve some of the pressure on DEP staff and make use of local expertise. Plans that identify and protect steep slopes should be required in every erosion and sediment control application for well pads, roads, and pipelines.

They also did not recommend increased permit application fees, to provide adequate DEP staff to review, inspect, and enforce permits. DEP has taken minor steps in this direction recently, but should not require taxpayers to fund administration of the regulatory program for shale gas development.

Citizens Commission Recommendations

-Based on public and expert comments received, the Citizens Commission can endorse many of the above-listed recommendations, several of which are similar to those found in other sections of this report. We offer a number of significant qualifications to those recommendations:

-General permits and waivers provide minimal opportunity for recognition or protection of resources at risk from shale gas development. They are subject to minimal public disclosure and notice, thus preventing transparency in the regulatory process. They should not be permitted. (9.1.2)

-We concur that penalties for violations should be increased sufficiently to achieve compliance and to deter violations, which DEP reports are very numerous. We also recommend that DEP use its existing authority to actually impose penalties for the submission of false or misleading information in permit applications. (9.2.1)

-The recommended minimum 1,000-foot setbacks between gas wells and public water supply wells, intakes, and reservoirs can be waived by public water supply operators. Special care should be taken by DEP to assure that public notice is made of any proposed waiver of minimum setbacks between gas wells and public water supplies. (9.2.11)

-DEP to date, has not prohibited gas wells and well pads in floodplains, The potential for water pollution during storm periods from overflowing waste pits and other pollutant sources is significant. As the number of wells increases, these activities pose an ever-greater threat to surface water quality. (9.2.12 and .13)

-Site inspections by DEP always should include at least one visit to the staked-out site of all proposed gas facilities prior to the beginning of any land disturbance activities. (9.2.15)

-The Citizens Commission supports the Governor's commission recommendations for placing well records and enforcement records online. (9.2.14 and .16) Equally important, all permit application information should be made available to the public online, now that such data are produced electronically. That would save time and money for DEP staff as well as providing greatly enhanced transparency.

-The Governor's commission encourages the shale gas and other resource-extracting industries to invest in watershed, stream, and forest improvements with the objective of securing credit for future damage to such resources. (9.2.19) The Citizens Commission emphasizes that primary concern should be placed on avoiding damage to resources, rather than seeking to compensate for damages after they have been incurred. Scientific evaluation of stream restoration activities gives little confidence that Pennsylvania stream quality and biota, once damaged, can ever be restored.

-According to current rules, drilling operators must restore the land within 9 to 15 months of drilling completion. When a well is no longer in operation, drillers must plug the well and restore the site within nine months. The well pads at shale gas wells may be used for many decades prior to site restoration. The Governor's commission recommends allowing DEP to extend the time for land restoration. (9.2.20) The need for this extension is not apparent, and it would appear to be subject to abuse. Thus we do not endorse it. There is no requirement for pipeline corridors to be restored to pre-construction vegetation, and most companies prefer to keep pipeline rights of way clear of woody vegetation to facilitate inspection. That often results in permanent fragmentation of forest habitat vital to migratory birds and other wildlife.

-The reuse of non-fresh water for gas well fracking is encouraged. (9.2.22) Under no circumstances, however, should liability be reduced for spills of Acid Mine Drainage just because of attempted use in gas well fracking. Long-term threats to groundwater aquifers are posed by every proposal to place wastes (including toxic fracking fluids) underground, as discussed in the section on wastewater disposal.

-Special Protection streams deserve more than cursory review. To implement protection of Special Protection streams (9.2.26), under existing authority DEP should require the applicant's inventory of all known High Quality or Exceptional Value streams within 500 of well pads plus any streams proposed for gas facility encroachment, with no less data than required in PADEP's 2005 Technical Guidance Document 563-2000-655 for coal mine watersheds, as part of every gas facility application.

-DEP and the PA Fish and Boat Commission should conduct surveys where drilling, pipeline, and other infrastructure is proposed in and near streams. This is especially important in forested watersheds not already designated as Special Protection waters, many of which have not been studied but may warrant special protection status.

-Under existing authority DEP should require a completed Jurisdictional Determination from the Army Corps of Engineers for every site or corridor where wetlands or other waters potentially might be affected as part of every gas well and gas well-related (road or pipeline) encroachment permit application. (9.2.26)

-DEP efforts to monitor the impacts of shale gas development should focus on cumulative and long-term impacts which currently are not addressed by the fragmented and uncoordinated process of permitting wells and ancillary facilities. (9.2.32)

Issue Exploration: Property Rights, Pooling, and Eminent Domain

The heart of the matter: The issue of property rights and degradation of land, water, and air is a growing concern for many Pennsylvania landowners – even those who don't lease their lands for drilling. Maintaining eminent domain laws, implementing drill spacing requirements, and grouping of leased lands between corporations could help protect property rights.

Commission Findings

During hearings before the Citizens Commission, Pennsylvanians voiced concerns about their properties and property. Many are afraid that their air, land, and water will be degraded even if they choose not to lease their rights, or if they live downstream of development. Some are concerned about health impacts from nearby wells and pipeline facilities. These impacts may reduce the value of their properties and their ability to sell them. Still others believe they may be forced to sell or lease their land or minerals against their will.

Citizens look to local governments and local officials to protect their property rights, through municipal zoning. The Oil and Gas Act restricts localities ability to regulate the operations of gas companies, such as noise or hours of operation. Although municipalities retain the right to zone industrial activities, gas companies have challenged local zoning ordinances enacted to protect citizens. Local officials told the Commission they needed help to craft good local zoning ordinances and money to defend them from lawsuits.

Current Practices

Pooling is a way to combine properties to minimize risk and maximize benefits.[1] Provisions are already in place for pooling under existing provisions of the 1961 Pennsylvania Oil and Gas Conservation Law. This law provides for an Oil and Gas Commission (with powers now transferred to the Department of Environmental Protection) to administer forced pooling applications and issue pooling orders after a public hearing. However, this provision applies only to wells below the Marcellus Shale that exist from the Onondaga limestone formation downward. Strata eligible for forced pooling include natural gas-rich Utica Shale, but to date little use has been made of forced pooling authorization in Pennsylvania. Currently, Marcellus Shale remains exempt from provisions regarding pooling, well spacing, and compulsory unitization allowed by the Oil and Gas Conservation Law.[2]

While forced pooling may be good for the industry and perhaps reduce environmental impacts pooling conflicts with the Pennsylvania Property Rights Act of 2006. This act specifically prohibits private enterprises from using eminent domain for development - except under limited circumstances that generally relate to blighted properties.

Governor's Commission Recommendations

The Governor's Marcellus Shale Advisory Commission recommended that the Commonwealth allow forced pooling in formations closer to the surface than Onondaga limestone, including the Marcellus shale.

To protect individual property rights, reduce risks, and increase benefits of natural gas extraction, the Commission recommends:

-The Oil and Gas Act should be revised to allow local ordinances to regulate industrial sites within their jurisdiction to protect public health, the environment and community values.

-The Oil and Gas Act should be revised to allow for the protection of the health and property of surface owners.

-Companies should be required to produce a detailed drilling plan and update it on a regular basis.

1 For a more complete discussion of pooling, see Pooling - Amassing Property for the Extraction of Natural Gas from the Marcellus Shale, www.PALWV.org

2 combining of wells producing from the same reservoir

-The Property Rights Act of 2006, which restricts the use of eminent domain, should be continued without amendment.

-Natural gas pipeline companies should not be given the right to eminent domain enjoyed by regulated public utilities.

-The General Assembly should limit the number of well pads, and set minimum spacing requirements based on best available practices.

-To minimize environmental risks and promote conservation, the grouping or pooling by companies of previously leased properties should be required. Drilling for natural gas under unleased properties should be prohibited.

-The General Assembly should adopt a Property Owners' Bill of Rights.

-Property owners leasing their mineral rights should be afforded three business days to reconsider and revoke their contract.

"Landmen" negotiating leases and contracts should obtain professional licenses similar to real estate agents.

Issue Exploration: Aquifer Contanmination

The heart of the matter: Once our natural resources have been compromised as a result of operator error, grout and/or casing failure, a blow-out, a major contaminant excursion, seismic activity, or an unforeseen breaching of geologic beds, it will almost certainly be impossible to remediate and restore them to their pre-existing conditions. Well-sealing technology should match and restore the natural hydrologic integrity that existed before drilling commences.

Citizens Commission Findings

One of the largest concerns associated with shale gas drilling is the potential groundwater and surface water contamination resulting from creation of a conduit for contaminants to flow through both the drilling boreholes and geologic fractures surrounding immense new wells. The process exposes streams, drinking water wells, and underground aquifers to potential contamination.

The oil and gas industry has long recognized the need to maintain the long-term integrity of boreholes that breach bedrock formations. The bedrock layers have naturally and effectively isolated freshwater aquifers from deep connate waters – the waters plus oil and gas trapped in sedimentary rock -- for millions of years.

Through gas drilling, deep formation waters are afforded an avenue to commingle with overlying freshwater aquifers when failure occurs in the sealant materials intended to isolate the well liner from surrounding rock. According to expert analyses provided to the Commission, well casings, cement, and cement plugs are not sufficiently durable to protect aquifers long-term. Thus they can often lead to pollution, either in the short term (during production) or as they degrade. Also, presently used cement mixtures and other materials are not required to achieve full zonal isolation in each well. This allows opportunities for escape and commingling of fresh and contaminated subsurface waters. The implications of short-term cement failure on long term aquifer water quality protection are extremely significant. They put at risk the water resources needed to support present and future generations.

Because hydraulic fracturing intentionally opens natural joints in the target rock—some of which may intersect pre-existing joints and faults well beyond the borehole— plugging and abandonment practices may do little to protect the environment after chemical additives have repeatedly been injected into bedrock formations under high pressure. Structural geologists have used emissions of natural gas to map naturally open joint and fracture pathways present between gas-rich shales and the ground surface. Hydrofractured wells greatly increase the long-term potential for gas leakage to the surface.

Additionally, only several hundred feet of grout currently is required above the Marcellus Shale. The balance of the borehole may not be grouted until the well reaches casings specifically protecting the freshwater aquifers. Leaving a large section of a borehole ungrouted, as is widespread current practice, allows fugitive gas from ungrouted formations to migrate up to the shallow fresh water. Some, but not all, drillers have voluntarily incurred the additional cost to case and grout the entirety of shale gas wells in Pennsylvania. Those who have not done so pose excessive risk to our water resources.

As scientists explained, in case of a failure of the grout above the Marcellus Shale or the open borehole's encounter with gas from a shallower zone, escaping gas can enter existing formation fractures and, as the result of the existing conditions underground, migrate away from the well. Using readily applicable analyses, experts have found that gas could potentially migrate miles laterally while moving a few thousand feet vertically. This distance of gas migration is consistent with gas bubbles in the Susquehanna River reported at a distance of three miles from known gas wells.

Research to date indicates that the life of concrete, whether above ground or downhole, under the best of circumstances, typically is less than 100 years. Even if this preliminary assessment is in error by an order of magnitude and the life of concrete is 1,000 years, this time frame for the design life of concrete very quickly results in jeopardizing the useful life of freshwater aquifers. It is important to note that cement life in a well bore may be significantly shortened by exposure to corrosive or acid gases, other well-documented cement

failure mechanisms acknowledged by the gas industry in numerous publications, and as a result of repeated ground shaking associated with regional seismic activity.

Corroded carbon steel casings left in plugged and abandoned gas and oil wells provide another significant conduit for light, non-aqueous phase liquids, brines, and gaseous contaminants to reach freshwater aquifers, even where cement remains intact. The time it takes low carbon steel to significantly corrode is about 80 years or less. Even stainless steel (at least as manufactured in the 1960s) may not be corrosion resistant in subaqueous, oxygen-poor, downhole environments because the outside protective layer may break down in the presence of chlorides or sulfates and low pH waters. It is only a matter of time before casings corrode away, exposing sheath and plug cement to corrosive attack while opening upward pathways to freshwater aquifers. Contaminant migration will occur in response to upward hydraulic gradients present between deep horizons and overlying freshwater aquifers where lower pressure conditions exist. Thus, the long-term integrity of a plugged and abandoned well has a high probability of failure within less than 100 years – far less time than the life of the aquifer. The corrosion of casing provides another weak link in downhole seals and thus poses a significant water quality and environmental risk.

The sheer number of orphan wells and the tens of thousands of new wells now planned underscore the critical nature of improperly or failed hydraulic seals. Each gas well represents a potential conductive pathway capable of transmitting gases and fluids upward into freshwater aquifers. Very long-term cement integrity and steel casing integrity are needed to protect the quality of freshwater aquifers for a million plus years.

Current Practices

According to experts who testified before the Commission, groundwater aquifers will support our communities with needed fresh water for more than 1 million years – so regulatory protections must also ensure protection from contamination well into the future.

Because gas drilling requires repeated breaching of geologic confining beds that naturally protect freshwater aquifers, it is important that drilling regulations and permitting recognize the natural life of our aquifers and consider long-term as well as cumulative impacts. Aquifer protection requires the use of downhole methods and materials that can withstand the passage of time and the harsh physical conditions of the drilling process and geologic formations with which they are in contact. Cement mixtures or alternate sealant materials must be capable of maintaining the long-term hydrologic integrity of freshwater aquifers separate from deep underlying geologic formations that contain saline water enriched with natural gas, radioactive elements, and hydrofracture-related chemicals.

Current state-of-the-art cement materials used in well completion and plugging and abandonment operations do not have a documented history of long-term durability. Problems with the integrity of well cement are well known in oil and gas fields. But Pennsylvania regulations do not require well casing and cementing plans to be submitted, reviewed, and approved as part of a well drilling permit application. The state and the public have no opportunities to review, intervene, and stop recognizably poor practices before work commences. Current regulations only require the submission of an after-the-fact well completion report that documents problems encountered while drilling. Well design flaws or improperly designed and executed hydraulic fracture jobs can be difficult, and in some cases impossible, to remedy after the fact.

DEP regulations (25 Pa. Code § 78.81) require the operator to case and cement a well to:

"(2) Prevent the migration of gas or other fluids into sources of fresh groundwater.

(3) Prevent pollution or diminution of fresh groundwater."

This existing legal obligation fully supports the Commission's recommended cement and steel casing requirements and practices that are necessary to protect freshwater aquifers.

Once groundwater resources have been compromised as a result of an operator error, grout and/or casing failure, a blow-out, a major contaminant excursion, seismic activity, or an unforeseen breaching of geologic beds, it is virtually impossible to remediate and restore them to their pre-existing conditions. The usual DEP

regulatory stance of allowing probable damage to be offset by the promise of partial future repair following the damage is not applicable to groundwater pollution from shale gas wells.

Best Practices

As the Commission learned from expert testimony and reports, state-of-the-art cement mixtures and sealants (such as self-healing FUTUR cement) are available that can react to and repair channels through which hydrocarbon-rich fluids and gas may otherwise migrate. State regulations do not require these, nor has the necessary long-term testing been done to ensure their long-term effectiveness for permanently protecting freshwater aquifers from down-well contamination. In addition, well construction analyses and cement integrity monitoring are standard industry best practices that provide protection and can prevent contaminants from migrating but are not required in Pennsylvania.

Citizens Commission Recommendations: Protecting Aquifers

-Protect freshwater aquifers for their expected useful life using well sealant materials that are sufficiently advanced to ensure their durability and mechanical properties.

-Guarantee long-term maintenance of production well sealant materials with legally binding and enforceable provisions.

-Find and plug all abandoned, unplugged, and poorly plugged wells throughout the entire wellbore from the ground surface to the lowest production zone within 1,000 feet of any new well.

-Old gas and oil wells should not be used for waste disposal, through methods such as underground injection, of hydrofracking wastewater where homeowner wells or abandoned or poorly plugged production wells exist within at least 3,000 feet.

-Demonstrate that no hydraulic connection is present along fracture pathways between planned gas wells and homeowner wells within a radial distance of at least 3,000 feet, as determined by a 24-hour, high-yield pumping test. Regulatory agencies and homeowners can predict and decrease the immediate risk of contaminant migration to water supplies by requiring basic hydrologic testing in advance of production well development. All homeowner and farm wells should be electronically monitored with transducers before, during, and after aquifer testing. If a hydraulic connection is determined via pumping, then the planned gas production well either should be abandoned and completed as a water supply well, or plugged and abandoned according to regulations. Such test results should be a mandatory part of each well drilling permit application for any well planned to be drilled below the base of freshwater aquifers.

Issue Exploration: Water Withdrawal

The heart of the matter: The ecological effects of water withdrawals for fracking are not being considered by current legislation, regulation or regulators. And yet, healthy stream ecosystems are vital to sustaining the vibrant ecotourism, hunting, fishing, and boating businesses that provide a high level of jobs and income to Commonwealth communities. Proper testing is needed "to know if the groundwater resources will be adversely impacted by the proposed withdrawal."

Commission Findings

Freshwater is finite. Less than 1 percent of the total volume of water on earth is accessible freshwater, and experts predict that by 2025, two-thirds of the global human population will face water shortages – and the shortages have already begun on many parts of the planet. Pennsylvania has beautiful freshwater streams that sustain all citizens, and we are blessed with an abundance of water. Every drop in the Delaware River, for example, is reused 20 times on its trip from the headwaters to the Delaware Bay, and the river is fully allocated for use. If water quantity becomes short, the quality of water goes down, the cost of living rises, and our quality of life suffers. Fracking pollutes water and injects it into the earth where it stays locked away, removing it from the hydrologic cycle.

On average, 5 million gallons of freshwater mixed with tens of thousands of gallons of chemicals are needed to hydraulically fracture, or "frack," a well. Amounts vary, depending on equipment, site specific conditions and the depth of the well. Wells may be fracked many times over the course of their operations to stimulate gas production. The water is drawn from a well or from surface water, such as a nearby stream. The use is usually classified as consumptive and depletive, because the water is typically not returned to streams or the atmosphere. Up to 87 percent of the freshwater used in the process remains underground. Potential impacts include depletion of drinking water supplies, aquifer depletion, stream flow depletion and disruption, interference with flow to wetlands and other water-dependent ecosystems, and a reduced capacity of the waterway ecosystem to handle increased pollution loads from drilling and other pollution inputs. In turn, drinking water supplies, aquatic life, fish, wildlife, and plant life can be affected.

Losing such high volumes of freshwater forever from the hydrologic cycle may be an unsustainable endeavor, potentially drying up the very headwater streams that protect our rivers for all downstream users. The ecological effects of diminished base flow due to water withdrawals for fracking are not being considered by current legislation, regulation or regulators. And yet, healthy stream ecosystems are vital to sustaining the vibrant ecotourism, hunting, fishing, and boating businesses that provide a high level of jobs and income to Commonwealth communities.

About 13 percent of the frack water typically returns to the surface with the recovered gas, according to Pennsylvania DEP estimates. This "flowback water" contains all of the chemicals used in fracking plus very high levels of salts, or total dissolved solids, making it five times as salty as seawater. Also often found in flowback wastewater: radioactive materials and contaminants like barium and strontium, since these elements naturally occur in the shale layer. Treating the flowback wastewater is an enormous technological challenge.

A study by the University of Pittsburgh validated concerns about inadequate treatment of the drilling wastewater. The study shows high levels for contaminants, including barium levels 14 times the U.S. Environmental Protection Agency's 2 ppm maximum contaminant level (MCL). For aquatic life protection, barium levels exceeded the MCL by 1.3 times and exceeded the EPA's standard for continuous concentration (CCC) to protect aquatic health by 6.7 times. Levels of bromide were detected at 10,688 times the 100 ppb level that raises concern in freshwater sources. Bromides in freshwater, when mixed with disinfection treatment processes for drinking water, form trihalomethanes and other chlorine-bromine byproducts that are hazardous to human health. Chloride levels reported in the University of Pittsburgh study were 138 times the EPA maximum (MCL) and 511 times the CCC to protect aquatic life. Gross pollution found for other constituents included but was not limited to strontium, benzene, manganese, 2 butoxyethanol, and total dissolved solids.

In April 2011, DEP asked companies to voluntarily refrain from disposing of wastewater at municipal treatment facilities, which dilute and discharge it into surface waters. There has been no publicized account regarding compliance. There are no legal obligations to honor the voluntary practice or any legal ramification for not participating.

Analysis has also demonstrated high levels of gas in the Utica Shale, which lies beneath the Marcellus, and the Upper Devonian shales that lie above the Marcellus – potentially extending the life of drilled wells, increasing the number of wells on existing sites, and increasing the footprint of gas activity beyond the current 54 Pennsylvania counties.

Current Practices

The Delaware River Basin Commission (DRBC) manages water withdrawals in eastern Pennsylvania, and the Susquehanna River Basin Commission (SRBC) manages withdrawals in the central part of the state. Water withdrawals outside of these two interstate compact commissions are not explicitly governed by state law, except for withdrawals by public drinking water suppliers. However, DEP has applied the water withdrawal standards of the SRBC to areas not governed by the DRBC or SRBC. DEP implements these standards through the water management plans required as a condition of all shale well drilling permits. Recognizing the increased water use associated with shale gas drilling and completions, DEP typically adds a special permit condition to shale gas wells requiring submission of water management plans. Water management plans are supposed to describe water sources meant for the drilling operation, including safe-yield calculations for surface water withdrawals for each new well They are also supposed to include best management practices and verify that Special Protection stream requirements are met and that designated uses of surface waters are protected. But ensuring implementation of these regulatory requirements has been a challenge.

Governor Commission Recommendations

The Governor's Marcellus Shale Advisory Commission did recommend that use of non-freshwater sources be encouraged but did not address the cumulative loss of freshwater due to fracking or recommend drilling prevention in areas where massive water losses would damage drinking water supplies or ecosystems. The governor's commission also did not address the application of water quality standards to the non-freshwater used in the drilling process. It is crucial that any freshwater used, or reused, in the drilling and fracking process that does not meet safe drinking water standards be prevented from contaminating streams or drinking water aquifers.

Best Practices

The impacts of hydraulic fracturing on the subsurface geology and ground water resources in the watersheds of the state are unknown and have not been studied or modeled by agency officials. A cumulative impact analysis or environmental study on the loss of groundwater for both drinking water wells, base flow of streams and elsewhere should be completed to assess the subsurface changes that would occur and the resulting environmental impacts. Models have been developed and implemented in other areas, including the Michigan Water Withdrawals Assessment Tool, at www.miwwat.org, which could be a starting point for more accurate models.

A study should be developed for each watershed that calculates how much total water can be removed without degrading surface and groundwater resources and Pennsylvania's unique habitats. This study should then be used to craft a plan that can guide spacing and location requirements that will inform drilling and permitting decision-making. The planning process should include location of withdrawals, rate and timing of withdrawals, pass-by flow requirements and stream and river flow regimes, nonpoint source pollution control plans, and an analysis of tributary and main stem flow regime. Such analysis and planning would prevent water resource depletion and the disruption of the flow regimes that now support species and ecosystems.

Water needed for fracking can be collected from surface and underground sources and stored over a significant time period in preparation for fracking. Given the ability to plan and estimate the time fracking will occur, regulations must ensure full biological protection of affected streams, rivers, and wetlands. Mandated regulatory protections need to ensure protection of minimum flows to maintain instream and downstream ecology, habitats and quality. All storage reservoirs

should be subject to minimum construction standards, and special requirements should be imposed on any reservoirs holding other than fresh water to prevent and detect leaks.

Property owners within the zone of influence of a natural gas well project should be notified if their well could be affected based on the findings of the aquifer testing that should be done for each well project and water withdrawal. A 3,000-foot guideline for notification is the minimum, and may need to be widened. Notification should be defined by those who could be affected by the project, based on aquifer testing.

Well drilling permit applications should specifically demonstrate and highlight how hydrofracking fluids will not degrade the quality of any groundwater aquifer through which the well extends.

Public signage and placards of trucks for the public to differentiate freshwater trucks from flowback water trucks must be clear and visible from a distance.

Approved withdrawal sites for surface and ground water must be clearly marked and visible by the public. Surveillance cameras or live-cams should be present at each of the withdrawal locations and made available online in real-time for the public to ensure dumping of wastewater does not occur.

DEP should develop an aquifer test plan requirement for each frack water supply well drilling application to evaluate relevant geological features, running the test for 72 hours to evaluate dewatering effects, and establish pass/fail criteria for evaluating the aquifer test results. Without such testing, the permittee cannot provide the data needed to establish whether groundwater resources will be adversely impacted by the proposed withdrawal.

To help prevent the consequences of water withdrawal, the Commission recommends:

- The oil and gas industry should be required to disclose all sources of water used in their operations.

-The oil and gas industry will be prohibited from withdrawing water from ground and surface sources within Pennsylvania during drought and other periods when residents or other industries are subject to restricted use.

-A cumulative impact analysis or environmental study on the loss of ground water for drinking water wells, base flow of streams and other water resources needs to be completed to assess the subsurface changes that would occur and the resulting environmental impacts.

- A study should be conducted in each of the Commonwealths watersheds that provides a calculation of how much total water can be removed without degrading surface and ground water resources, affecting unique habitats or negatively impacting other water uses in the commonwealth.

-For waters of the Commonwealth not regulated by the SRBC or DRBC, the DEP should create and implement its own no less stringent water withdrawal assessments, reviews and permitting obligations.

-An Aquifer Test should be required for each gas drilling permit application.

-Fees for the withdrawal of water for consumptive permits should be set significant higher than fees for water that remains within the water cycle.

Issue Exploration: Create Revenue Sources from Gas Extraction

The heart of the matter: At each hearing, citizens testified about the need for a tax on the natural gas industry to pay for current and long-term damage and to compensate citizens for the removal of their resource. A drilling tax – comparable with other drilling states -- could ameliorate staff shortages and lack of enforcement capabilities at the Department of Environmental Protection, and it could help create a trust fund for long-term environmental damage.

Citizens Commission Findings

By failing to have a drilling or severance tax on natural gas extraction activity, Pennsylvania is out of step with other major energy-producing states. These states have enacted drilling taxes because energy production creates what economists call externalities – the costs of an economic activity that aren't included in the price of the good. With natural gas extraction, externalities include air and water pollution, road and bridge damage, emergency response, and damage to wild spaces and habitat. Other costs include demands on social services, local and state police, education and health care, plus the loss of affordable housing. A reasonable drilling tax can help offset these costs and compensate Pennsylvania citizens for the permanent removal of this non-renewable resource.

Best Practices

A 5 percent drilling tax rate would be comparable with other states that have significant natural gas development – below neighboring West Virginia's current rate of about 6 percent, and less than Wyoming, New Mexico, and Texas.

Since drilling activity has impacts throughout a well's production life, taxation should not be limited to the first 10 years of production.

The drilling tax proceeds should be distributed among local governments affected by drilling activity, environmental protection and remediation efforts, and statewide priorities. That disbursement addresses major issues associated with natural gas development. Local communities feel the direct impact, positive and negative, of natural gas development but receive little to no additional revenue from this economic activity. State government is responsible for protecting our air, water, and land and coordinating local efforts. Together, state and local governments provide public protection, safety net services, education and infrastructure – all of which are affected by gas development.

As Pennsylvania's long history with resource extraction has shown, state and local governments - and ultimately, the taxpayers - bear the costs of resource development and remediation. That period is followed by reorientation of local economies once the boom turns to bust. Even with the best regulation, natural gas development will have a negative impact on the environment. A drilling tax should generate revenue to address these impacts today, rather than kicking the can down the road.

Using a portion of the proceeds to better protect and preserve our natural areas helps us be responsible stewards for future generations. The tax would significantly reduce pressure to drill on public lands, or to divert Oil and Gas Lease Fund revenue for non-conservation purposes.

Drilling tax revenue should not be limited to solely to communities with active drilling, as drilling impacts range across the state. Finally the drilling tax should be treated as other taxes are: contributing to education, health care and other shared state priorities.

Governor's Commission Findings

The Governor's Marcellus Shale Advisory Commission recommended a narrowly defined drilling fee, limited to offsetting demonstrable impacts. The Commission recommended "the enactment of – or authorization to impose a fee for – the purpose of mitigating and offsetting the uncompensated portion of demonstrated impacts borne by the citizens and local governments of the Commonwealth attributable to unconventional natural gas development." No specific rate was recommended – only that it should not "unreasonably

impede the development of natural gas" and "should include a correlation between the amount of the fee and costs incurred."[1]

The Governor's Commission recommendation also fails to live up to Article I, Section 27 of the Pennsylvania Constitution, which reads, "The people have a right to clean air, pure water, and to the preservation of the natural, scenic, historic and esthetic values of the environment. Pennsylvania's public natural resources are the common property of all the people, including generations yet to come.

As trustee of these resources, the Commonwealth shall conserve and maintain them for the benefit of all the people."[2]

Recommendations:
The Citizens Commission believes that the governor's commission recommendations were narrow and insufficient, because state government bears the cost of much of the impact through wear and tear on state highways and bridges and heightened protection from Pennsylvania State Police. Plus, much of the impact is difficult to quantify and put a price tag on, and it's unreasonable to ask local governments to fill out an invoice for damages. The governor's commission would not provide funding to increase DEP's regulatory and monitoring capabilities -- a key flaw.

The Citizen's Commission recommends:

-Pennsylvania should enact a meaningful drilling tax at the state level that sets a rate comparable to that in West Virginia, and distributes funds primarily to impacted communities as the industry grows and declines, to preservation and enhancement of natural resources, and the monitoring and protection of public health..

-A municipality's receipt of revenue from any drilling tax or impact fee should not be linked to its adoption of a state zoning ordinance.

-The ability of local governments to assess the value of oil and gas reserves for local property tax purposes should be restored.

-Mandatory contributions by the industry to a state superfund should be established to deal with unintended consequences.

1 http://www.portal.state.pa.us/portal/server.pt/document/1093774/msac_final_report_pdf

2 http://sites.state.pa.us/PA_Constitution.html.

Issue Exploration: Health Issues

The heart of the matter: Health professionals and citizens ask: Who will pay the ultimate price for natural gas drilling? Pennsylvania should mandate stringent best management practices and adequate monitoring to avoid the harmful practices of the past.

Citizens Commission Findings

Citizens were skeptical that Pennsylvania policymakers would address health and environmental concerns in a rigorous, proactive way. The same fear was echoed in many statements to the Commission:

"Pennsylvania has a tainted record on its ability to protect our environment and the health of the public over many past decades."

"Witness our record on strip mining where acid drainage is still running rampant. What about our history with black lung disease in our workers in the deep mines?"

"What about the many people exposed to hazardous chemical due to lack of regulations over the disposal of extremely hazardous chemicals in non regulated disposal sites?"

"Can we trust our government and the drilling industry to protect our citizens now with the potential for new exposures from hydraulic fracturing within the Marcellus Shale region?"

Many of the concerns, raised by citizens and health professionals, coalesced around these points:

- Diesel fumes and dust from mud on roads can deteriorate private homes and cause airborne health problems.
- Overall noise from compressor stations, drilling operations, and heavy truck traffic.
- Combinations of noise, airborne toxins, and water contamination have created severe health impacts for families and livestock near gas drilling regions.
- Contamination of groundwater, wells and springs, and farm ponds -- in some cases, long after nearby drilling and hydrofracking.
- Negative effects from noise pollution on residents close to the drill sites and compressor stations.
- Possible birth defects from chemicals such as benzene and heavy metals.
- Lack of regular air quality monitoring around drill and compression sites.
- Need for an immediate health registry and database to track illnesses.
- Contamination of private water supplies. Baseline data for wells and ongoing well-water testing are needed, but they're a very costly – if not impossible – burden for individual homeowners.
- Inadequate disclosure of the chemicals and the amounts of each chemical used in the hydraulic fracturing process to understand the potential health effects.
- Cumulative effect of ongoing exposure to contaminants in the air and water such as diesel fuel, VOCs, and particulates.
- Effects on children, whose metabolism differs from adults.
- Insufficient environmental regulatory oversight in comparison to other heavy industrial activities.
- Lack of faith in the ability of governmental agencies to protect the health of the people.
- Lack of research regarding human health effects.

At each hearing, individuals testified on specific health impacts, such as asthma, respiratory infections, dizziness, bleeding, headaches, nosebleeds, and vomiting. Some people raised concerns over possible birth defects from pregnant women's exposure to chemicals such as benzene. Farmers testified on incidents involving pets and livestock deaths and birth defects.

Dr. Walter Tsou, president of the Physicians for Social Responsibility Philadelphia chapter and a public health physician, said he has "grave concerns about public health and environmental consequences of hydraulic fracturing in the Marcellus shake region."

"To naively believe that you can put 4.5 millions of gallons of contaminated water into the ground and that it will never seep into our aquifers or riverbeds is not realistic," he said.

Dr. Pouni Saberi argued that the science needed to fully anticipate and understand the effects of gas drilling is "sorely lacking." She called for a moratorium until the science is available.

Two family physicians from South Fayette reported seeing patients with health problems that could be drilling related. They asked for a health registry to track illnesses.

Best Practices

In New York State, a group of 250 doctors, medical authorities, and the American Academy of Pediatricians' regional office called for an independent health impact review before permits could be awarded for Marcellus Shale drilling. The letter asked for a full assessment of the
public health impacts of gas exploration and production, including analysis of the existing
documentation of the baseline health status of the New York State population; systematic identification
and analysis of direct and indirect health effects; a cumulative health impacts analysis that includes a
reasonable "worst case" assessment; and any potential measures to eliminate these impacts.
Their letter to Governor Cuomo and supporting documentation are at www.psehealthyenergy.org.

Health impact analyses (HIA) have been performed in other jurisdictions. In 2008, an HIA was completed for the U.S. Bureau of Land Management regarding an oil and gas development proposal in Alaska's North Slope, and a multi-stage HIA for natural gas development and production has been done in Garfield County, Colorado.

The Pediatric Environmental Health Specialty Units has developed a position paper, with the input of professionals nationwide, to understand and address the health impacts on children. Information is available at www.pehsu.net.[1]

Governor's Commission Findings

Governor Corbett's Marcellus Shale Advisory Commission's report recommended that the Pennsylvania Department of Health (DOH) "work in partnership with the Commonwealth's graduate schools of public health and other appropriate medical institutions to better protect and enhance the public health interests of citizens, such as through the establishment of the population-based health registry and curriculum development." In addition, the report called for the DOH to "collect and evaluate clinical data provided by health care providers" and to "evaluate and assess Marcellus Shale-related environmental data."

Time is of the essence on these recommendations if we are to begin to protect the public's health. DOH must be funded adequately to effectively implement these recommendations.

Citizens Commission Recommendations: Health

Now is the time to mandate the most stringent best management practices and adequate monitoring to ensure that the harmful practices of our past will not recur. The Citizens Commission recommends:

-Immediately create a health registry and data base to track illnesses in drilling communities; use pre-existing data gathered in other states where appropriate. Adequate funding must be supplied to the PA Department of Health to cover the costs of creating a health registry and data base.

-Industry should be required to disclose both the identities and amounts of each chemical (by common name and brand name) used in the hydraulic fracturing process to help health officials understand the likely health effects and treat exposures.

-Occupational health of shale gas workers should be monitored by the Department of Labor and Industry.

1 http://aoec.org/PEHSU/documents/hydraulic_fracturing_and_children_2011_health_prof.pdf

Issue Exploration: Job Creation & Employment

Heart of the matter: The impact of Marcellus Shale on Pennsylvania's employment situation has been greatly overstated. The public would be better served with accurate data about the number of new jobs created by the industry and the impact of these new jobs on the economy as a whole.

Citizens Commission Findings

The potential for large-scale job creation has been one of the prime forces behind the rush to approve unlimited, unrestrained development of gas production from the Marcellus Shale. Four years into Marcellus Shale development, several assessments of real employment creation indicate that earlier expectations have not been realized and the impact of Marcellus Shale on Pennsylvania's employment situation has been greatly overstated.

The public would be better served with accurate data about the number of new jobs created by the industry and the impact of these new jobs on the economy as a whole.

Current Practices

Several entities have developed estimates of the impact of Marcellus Shale Development on jobs. The Pennsylvania Department of Labor & Industry's Center for Workforce Information and Analysis (CWIA) has identified six core industries which define the direct employment in drilling, production and pipelines, plus 30 ancillary industries in which some of the employment is attributable to increased natural gas production. [1]

There is no question that employment in the Marcellus core industries – those directly related to drilling, production, processing, and transportation of gas – has grown rapidly since the beginning of Pennsylvania's shale gas boom. At the end of 2007, a total of 9,500 people worked in these six core industries in Pennsylvania. By the end of 2010, that number had nearly doubled, to 18,800.[2] While significant, this figure represents less than 10 percent of the total new jobs created in Pennsylvania since the lowest point of the recession and the beginning of the recovery. [3]

CWIA also reports 199,377 jobs in ancillary industries as of the first quarter of 2010. In some cases, however, only a very small portion of ancillary industries are linked to Marcellus drilling. CWIA counts all jobs in ancillary industries as Marcellus-related, which overstates the impact. Most employment in ancillary industries such as road construction, test labs, power generation, trucking, mining, machinery sales, and steel production were not created by the Marcellus Shale boom.

A study of the multiplier effect of gas drilling: the impact on jobs outside the industry (restaurants, lawyers, from general purchases made by the industry, employees and leaseholders), "The Pennsylvania Marcellus Gas Industry: Status, Economic Impacts and Future Potential," would indicate that 23,000 to 24,000 additional jobs have been created as a direct result of Marcellus development, outside of the core and ancillary Marcellus Industries in 2010. This is an important contribution to the overall employment picture in Pennsylvania but falls well short of the estimated 216,000 jobs needed to restore employment to prerecession levels. Commonwealth.

New employment opportunities in the Marcellus Shale have been overstated by a variety of sources. Information about the number of new hires in the industry has mistakenly been reported as new jobs. For instance, the Patriot-News, Harrisburg, reported on May 29, 2011, that 48,000 jobs had been created in the Marcellus industries between the fourth quarter of 2009 and the second quarter of 2011.

The new hires figure is the total number of hires and does not differentiate between people who are hired for new positions and those who are hired to replace other workers who have left these positions. During the same time, there were 2.8 million new hires in Pennsylvania

1 Marcellus Shale Fast Facts
http://www.paworkstats.state.pa.us/admin/gsipub/htmlarea/uploads/Marcellus_Shale_Fast_Facts_Viewing.pdf

2 Ibid

3 Keystone Research Center:

but only 85,000 new jobs created. So, the 48,000 new hires account for fewer than 2 percent of the 2.8 million new hires in Pennsylvania.[4]

The number of jobs in ancillary industries is often misrepresented as a number of Marcellus-related jobs. While the total employment in the Marcellus ancillary industries is about 200,000 jobs, most of those jobs are not related to Marcellus Shale development. In fact, total employment in ancillary industries has fallen by 3 percent since the beginning of the Marcellus boom in 2007.[5]

Inflated estimates of the Marcellus jobs impact have been generated in industry-funded studies using models that make unrealistic assumptions. For example, a July 2011 study from the Penn State College of Earth and Mineral Sciences estimates that 60,168 jobs total were created by the Marcellus industry in 2009, far above the 23,000 to 24,000 cited above.[6] That study estimated a total jobs impact of nearly 140,000 in 2010 and projected growth to 256,420 by 2020.

Among the flaws in that study cited by Bucknell University Professor Thomas Kinnamin were the assumptions that all royalty income from gas extracted would be spent the same year in Pennsylvania[7], and that 95 percent of the income spent by Marcellus companies on workers, suppliers, and royalty recipients went to Pennsylvanians.[8]

A missing factor in Marcellus industry job-creation reports is the real and potential loss of jobs in other industries as a result of the environmental and social impacts of the Marcellus boom. In the course of the five hearings, the Commission heard testimony indicating that agriculture, leisure tourism, fishing and boating, and hunting have been negatively impacted financially as a result of Marcellus development. Others expressed concern at the effects of Marcellus drilling on Pennsylvania's hardwood forests – the first among states certified as sustainable. The loss of this certification would impact Pennsylvania's national and worldwide leadership in hardwood products. The hardwood industry employs 90,000 people in Pennsylvania.

The Marcellus Shale is a Pennsylvania resource that is largely being developed by out-of-state entities that have imported skilled gas production workers. Witnesses at Commission hearings clearly indicated that company workers are considered to be outsiders by local residents. Without a clear strategy to move Pennsylvanians into gas production jobs, this trend is likely to continue.

The share of direct jobs going to Pennsylvanians has not been clearly identified. Rose Baker of Penn State offered the best estimate -- that about 70 percent of direct jobs are filled with out-of-state workers. This number may be well overstated. CWIA counts most jobs (almost 200,000) in Marcellus ancillary industries, and most ancillary industries are not in fact related to Marcellus drilling, the total number is likely overrepresents the share of Marcellus jobs held by Pennsylvanians.

The Commission heard testimony from several small businesses that have benefited from Marcellus activity. A small construction firm, a diesel trucking company, and a welder all testified that they stabilized their businesses – once faltering in the recession -- and have added jobs.

Governor's Commission Recommendations

Among its suggestions for boosting employment opportunities for Pennsylvanians, the Governor's Marcellus Shale Advisory Commission recommended that the Commonwealth "work with the natural gas industry to identify future employment opportunities, and partner with academic institutions, including trade and technical schools, to develop and disseminate curriculum and training needed to educate and provide employment opportunities for Pennsylvania workers." The commission also urged "providing additional

4 The quoted figure of 48,000 new hires is not derived from an employment database but is extrapolated from the U.S. Department of Health and Human Services Office of Child Support Enforcement, which tracks when non-custodial parents obligated to pay child support are hired.

5 Keystone Research Center

6 Timothy J. Considine, Robert Watson, and Seth Blumsack, The Pennsylvania Marcellus Natural Gas Industry: Status, Economic Impacts and Future Potential, study for the Marcellus Shale Coalition, online at http://marcelluscoalition.org/wp-content/uploads/2011/07/Final-2011-PA-Marcellus-Economic-Impacts.pdf.

7 Pennsylvania households can be expected to save most of these earnings. Kinnaman points to an economic impact study of shale gas extraction in Louisiana which assumed that households spend only 5% of windfall earnings within the year received. Kinnaman also points out that, given national and international capital markets, additional savings by Pennsylvania households are unlikely to be lent to Pennsylvanians.

8 Thomas C. Kinnaman, "The economic impact of shale gas extraction: A review of existing studies," *Ecological Economics* 70 (2011) 12343-1249.

job training assistance and certification programs… to individuals seeking employment in the natural gas industry."

The governor's commission report sought clarity about the number of jobs now being lost to out-of-state workers and a more clearly "branded" jobs initiative that includes the resources and political will to achieve specific increases in jobs for Pennsylvanians.

Citizens Commission Recommendations

The Citizens Commission recommends:

-The Department of Labor and Industry should undertake an analysis of the impact of Marcellus gas development on the agriculture, tourism, and timber industries. All new analysis of jobs should account for changes in employment in all of these industries and should track the jobs impact over time.

-A reliable, standard methodology should be established to track Marcellus Shale employment impact, including research on the share of jobs held by Pennsylvania and non-Pennsylvania workers. The Department of Labor and Industry should convene a group of academic researchers to develop a standard consensus protocol. New hires data should not be used to track employment changes in Marcellus gas-related industries.

-The Commonwealth should establish a program to train unemployed Pennsylvania workers for high-paid Marcellus jobs.

-Pennsylvania should create a Permanent Trust Fund that supports diversification of the economy in gas drilling communities and development of industries that can prosper after the Marcellus boom.[9]

9 On this concept, see Sean O'Leary, Ted Boettner, and Rory McIlmoil, "Marcellus Shale Gas Drilling: What Does it Mean for Economic Development?" West Virginia Center on Budget and Policy, online at www.wvpolicy.org/downloads/marcellus_pres021311.pdf.

Issue Exploration: Pipelines and Compressor Stations

The heart of the matter: Pipelines necessary to transmit natural gas from the wells to processing areas and then to larger intrastate and interstate networks will stretch across thousands of miles. Gathering lines and transmission pipelines require compressor stations which affect air quality through emission of criteria pollutants, toxic pollutants and that alter community character. Pipelines will impact water and land for decades through creation of hard surfaces which increase storm water runoff, and have the potential to contaminate surface water and disrupt habitats. Regulation of pipeline infrastructure is very limited and fragmented.

The DEP does not currently oversee siting of pipelines; its authority extends only to stream crossing, erosion & sediment control and compressor stations. Although pipelines have the potential to significantly impact the Commonwealth's environment, waterways and ecosystems, the DEP does not conduct a cumulative impact review that includes wellpads and pipelines.

The Public Utility Commission currently has authority to regulate siting for public utilities, but as most pipeline companies are not public utilities, this authority has not been exercised. Gathering lines of the pipeline system are unregulated by PA PUC.

Eminent domain is the power to take private property for public use by a state, municipality, or private person or corporation authorized to exercise functions of public character, following the payment of just compensation to the owner of that property.[1]

Related to the area of eminent domain is the emerging debate regarding the characterization of pipeline companies as "public utilities."[2] With such status comes essential oversight for safety and siting. At the same time such designation carries the right to eminent domain. This is particularly controversial when considering the extensive pipeline network and the right-of-ways that will be required for gathering lines, related facilities, and compression stations. Currently easements for gathering lines need to be negotiated between non-public utility companies and property owners who cannot be forced to allow pipelines on their property through eminent domain.

Compressor engines are a significant source of fugitive, vented, and combustion emissions. During normal operations, unburned methane is emitted in the engine exhaust, and fugitive emissions can result from leaks in valves and pressurized connections. Natural gas is vented during engine start-ups if natural gas is used to power the starter turbine. During upsets, natural gas is released from compressor blowdown and pressure relief valves.

The Commission heard a testimony from citizens about pipelines compressor stations being build in tandem with gas production. Hearings in Williamsport and Wysox, where Marcellus Shale exploration is more mature and has begun to produce pipeline infrastructure expansion, produced the lion share of pipeline testimony. Pipeline related testimony most often cited addressed erosion and sediment control issues, compressor stations concerns of air quality, noise, quality of life and property devaluation, lack of regulation of gathering lines and landowner rights.

Pam Judy, a resident Carmichaels, Greene County gave the Commission a taste of the impacts of pipeline infrastructure. Pam lives in a home with a compressor station built 780 feet away in 2009. She testified that, when dealing with "the Company", she was told the compressor station would not be located near her home. She testifies she lives with a constant "kerosene, sweet diesel odor" and suffers from a burning throat, fatigue, "a feeling of cement in bones," and vertigo. She reports that after a short hunting trip to her property a relative suffered blisters in mouth and throat caused by toxicity of air and requiring a trip to the local emergency room.

Peggy from Williamsport noted that a fumes from a compressor station near the Mt. Zion Church have affected alfalfa crops. Ralph Kisberg testified that

1 http://legal-dictionary.thefreedictionary.com/eminent+domain

2 The transmission of gas through pipelines and its regulation are explored in more depth in study guides available at palwv.org.

Lycoming County has seen an expansion in pipeline infrastructure but noted that almost no information is available the number of gathering and transmission lines, or compressor stations is available to citizens or municipalities.

Protecting public health and the environment from the negative impacts of natural gas transmission is a shared responsibility of national, state, and local agencies. The Pipeline Safety Trust (www.pstrust.org) is a useful resource to guide understanding of the infrastructure and the interconnected agencies responsible for its permitting, regulation, oversight, and enforcement process. To gain an overview of the related issues specific to Pennsylvania, consult the League of Women Voters of Pennsylvania Natural Gas Extraction Study Guide Addendum on Pipelines (www.palwv.org).

Governor's Commission Recommendations

To address the lack of coordinated permitting processes for pipeline deployment, the Commonwealth should designate a state agency to create a "One-Stop" permitting process while expanding the use of General Permits to authorize routine development activities, as well as maintain jurisdiction over multi-county linear pipeline projects and ensure appropriate notifications have been made to local jurisdictions. It is not the purpose of this proposal to encourage the expansion of statutory jurisdiction of the Public Utility Commission beyond gas safety oversight in so far as non-jurisdictional gathering lines are concerned. (9.12)

The Public Utility Commission should be given statutory gas safety oversight of non-jurisdictional intra-state gathering systems, safety standards regarding the design, construction and installation of such lines within Class 1 areas. (9.17)

A lead state agency should be designated to alleviate delays in linear pipeline project development and approval; to identify redundant (state and federal) natural and cultural resource reviews which should be eliminated; to properly tailor the scope of agency reviews; and the PA Natural Resource Inventory on-line tool should be expanded to accommodate linear projects longer than 15,000 feet. (9.1.13)

Citizen Commission Recommendations

To help protect individual property rights and prevent the misuse of eminent domain, the Commission recommends that:
- All new pipelines should be designed to comply with maximum safety standards regardless of where they are located.

- Watershed and wetland protection plans should be developed and implemented in conjunction with DEP and watershed associations and commissions such as the DRBC and SRBC for all pipeline crossings.

-Remove loopholes that hold industry to less stringent state standards for erosion and sediment control.

-All pipeline companies should be required, at the very least, to comply with DEP Chapter 102 Erosion and Sediment Control regulations with gravel roads treated as development.

-Conservation District oversight of pipeline sediment and erosion should be restored.

-Minimum setbacks from dwellings, schools and other environmentally sensitive areas should be established for pipelines of all classifications and for compressor stations using US DOT PIPA recommendations to ensure a safety zone. Notification to all stakeholders within 2,000 feet of proposed compressors should be required.

-Irrespective of whether the sponsor is a public utility, the PUC should have the authority to regulate all pipelines, including gathering lines, for safety.

-Prior to well drilling permit approval, detailed infrastructure plans should be submitted to the PUC and to DEP which include the total number of compressor stations, gathering lines, capacity, and distance requirements of compressor stations.

-Prior to well drilling permit approval, detailed plans for gathering lines, transmission and distribution infrastructure should be submitted PA PUC and US DOT. Detailed plans should include pipeline diameter, psi, and miles of pipeline required for each classification.

-Require compressor engines testing at 100% capacity at all times with full and documented disclosure under PA Right to Know Act.

-Air quality studies should aggregate compressor station emissions rather than single station emissions, data should be collected by company and by geographic area.

- Pennsylvania should apply comparable reporting and safety regulation requirement to all pipeline infrastructure from gathering line, transmission and distribution lines and construction standards at least as strong as the most stringent neighboring states.

Impacts on Individuals and Communities Must Be Addressed

-enact a robust statewide drilling tax that provides resources to local governments to pay for drilling and growth related costs.

-to better preserve the rural nature of Pennsylvania communities, provide technical assistance to local governments to improve planning and land use capacity.

-support the formation of ongoing county task forces as a vehicle to further understand concerns, and solve problems identified by citizens.

-in response to the critical shortage of housing in the Marcellus Shale region, as noted in the Governor's Advisory Commission Report, a portion of any drilling fee established should be dedicated to affordable housing through direct payments to county affordable funds established under the Optional County Affordable Housing Act and to the State Housing Trust Fund, administered by the Pennsylvania Housing Finance Agency.

-other state action regarding housing include encouraging gas companies to invest in housing through the use of the state's Low-income and Neighborhood Assistance tax credit programs; coordinate planning for housing needs and assist the local housing authorities to justify increases in the federally established Fair Market Rent.

-provide additional resources to services for victims of sexual assault and domestic violence.

-provide human service providers access to translation services to meet the needs of the workers and their families who are non-English speakers.

- provide support to address identified human service needs such in education, training, and health care.

Commissioner Biographies

Carole Rubley, Co-chair

Carole Rubley was elected to serve in the Pennsylvania House of Representatives from 1992 through 2008. Throughout her tenure, she served on the House Environmental Resources and Energy Committee where she also served as chair of the Energy Committee from 2006 – 2008. She was a member of the PA Infrastructure Investment Authority (PENNVEST) for 16 years and was the minority chair of the House Children and Youth Committee from 2006 to 2008. In addition to many other committees and caucuses, Carole served on the Speaker's Commission on Legislative Reform which resulted in the implementation of numerous House reform measures.
Carole was active with the National Conference of State Legislatures (NCSL) where she chaired the Committee on Environment & Natural Resources and was a vice chair of the Committee on Agriculture, Energy & Electric Utilities.
Her prior work history includes Project Manager with Environmental Resources Management, Inc. (ERM) in Exton, from 1988-1992; Solid Waste Coordinator with the Chester County Health Department from 1981-1988; and real estate sales from 1976-1981.
She has a Bachelor of Arts degree in Biology from Albertus Magnus College in New Haven, Connecticut, and a Master of Science degree in Environmental Health from West Chester University.

During her legislative career, she had 14 bills signed into law.

Dan Surra, Co-chair

Dan Surra graduated from Penn State University with a Bachelor of Science degree in Industrial Arts Education.
For 14 years he was an educator in the DuBois Area School District. He was a co-founder of the Pennsylvania Environmental Network and an active grass roots environmentalist prior to being elected to the Pennsylvania General Assembly in 1990.
He represented the 75th legislative district for 18 years which includes all of Elk County and the northwestern portions of Clearfield County. He served on the Environmental and Energy Committee in the House for 16 years before being elected as one of the leaders of the House Democratic Caucus in 2006.
From 2009 until 2011, Dan worked at the Department of Conservation and Natural Resources as a Senior Advisor on the PA Wilds Initiative and was the Executive Director of the Governor's Advisory Council on Hunting, Fishing and Conservation.
Dan retired recently from state government and lives in Kersey, Pa. with his wife of 34 years, Victoria. He is the father of three sons and his hobbies include hunting, fishing and auto racing.

MEMBERS

Anna Alford, Crystal Lake Ski Center

Anna Alford grew up on a very special piece of forested, mountaintop property, known as Crystal Lake, the site of a children's summer camp founded by her grandparents and a ski center started by her parents. She earned a BA in English Literature from Principia College in Elsah, IL, a juris doctor degree from Western New England School of Law in Springfield, MA and passed the Pennsylvania Bar Exam. After clerking for Judge Kenneth Brown in the Lycoming County Court of Common Pleas and teaching legal research and writing at Western New England College School of Law, she decided to leave the practice of law to work full time at Crystal Lake Camps, as Assistant Director and later as Director. More recently she spent some time living and working in California and Oregon, as a group home manager for developmentally disabled adults and manager of a retirement community. Over 5 years ago, she returned to Pennsylvania. She currently is the manager of Crystal Lake Ski Center and the owner of Bellevue Cottage B&B. She is also the editor of The Williamsport Guardian, a volunteer operated alternative bi-monthly newspaper.

Thomas Au, Pennsylvania Chapter of Sierra Club

Thomas Au is conservation chair of the Pennsylvania Chapter of the Sierra Club. He has worked as an environmental attorney for over 30 years. He retired as Assistant Chief Counsel for the Pennsylvania Department of Environmental Protection in 2004.

Dencil Backus, California University, Washington County resident

Dencil Backus has been on the faculty in the Department of Communication Studies at California University of Pennsylvania since 1983 and spent 12 years as department chair. The primary focus of his teaching and research is organizational communication, public relations, and the dynamics of group decision making. Having spent his formative years in the coal fields of West Virginia, he is concerned that the Commonwealth avoid the problems of hastily developing a natural resource without appropriate safeguards and regulation. He coordinated a citizen's committee to create a zoning ordinance for the township in which the first Marcellus well was drilled. He became active with the issue in 2009 upon learning that a company involved in natural gas processing in the township had proposed the ordinance they wanted the township to pass.

Duke Barrett, Gas Drilling Awareness Coalition of Luzerne County

Duke Barrett serves as an Executive Committee Member - Web Development - for the Gas Drilling Awareness Coalition of Luzerne County. He became involved with GDAC in the Spring of 2010 upon learning of a planned compressor station in his home town of Dallas, Pa., near the Dallas Schools complex. He has created the group's website (http://www.GDACoalition.org), brochures, posters and other materials. In September 2010, he spoke in Harrisburg with activist Gene Stilp to a group of concerned citizens on the issues of forced pooling and the elimination of local zoning, which was broadcast live on PNC TV. It was announced at this press conference that the Pennsylvania Department of Homeland Security had been monitoring citizens concerned about the negative industrial effects of gas drilling. Professionally, Duke is the founder of and, for the last 20 years, the VP of Special Projects for www.DeadSolidgolf.com, a company that designs and manufactures full-size golf simulators.

Lynda K. Farrell, Executive Director of Pipeline Safety Coalition

Lynda K. Farrell was first introduced to gas pipeline safety when the rumble of an unannounced "smart pig" shook the earth below her farm. She became a grass roots advocate for pipeline education and safety when the same gas pipeline led her and four neighbors to federal eminent domain proceedings in an effort to protect their land, steep slopes and the historic Brandywine Creek. "The Brandywine Five," as they were dubbed by a federal judge, won their case, fended off eminent domain in a landmark decision and were awarded attorney fees. Realizing that pipelines and her farm were not compatible, Lynda combined a diverse background in education, finance, marketing and farming to provide environmental/agricultural consulting and grant writing for over a decade. Her efforts are now focused on improving public, personal and environmental safety in pipeline issues through the Pipeline Safety Coalition (PSC), a Pennsylvania nonprofit. It was created "to gather and serve as a clearinghouse for factual, unbiased information; to increase public awareness and participation through education; to build partnerships with residents, safety advocates, government and industry; and to improve pubic, personal and environmental safety in pipeline issues." Pipeline Safety Coalition was first conceived by 20 landowners disenfranchised in their attempts to find accurate information in a 2008 Chester County pipeline project. In 2009, the 20 formed an ad hoc community group, the Citizens Coalition for Environmental and Property Protection in Pipeline Operations, volunteering time, lessons learned and personal expense to provide all citizens equal access to factual, unbiased information in pipeline safety issues. They vowed to one day form a dedicated nonprofit so that others would not endure the frustration and hardship they had faced. Their pledge has been fulfilled in the Pipeline Safety Coalition (www.pscoalition.org).

Barbara Jarmoska, Responsible Drilling Alliance

Barbara Jarmoska is a teacher, business owner, consultant, and journalist. She is the founder and President of Freshlife, Inc. — a natural products supermarket located in Williamsport. She received her BS in Special Education from Indiana University of Pennsylvania, completed post-graduate studies in Early Childhood Education at Mansfield University and for the past three decades has been studying, practicing, and teaching the principles of natural health. Barb is the managing editor of Options, a magazine on integrative health, and serves on the Board of Directors of the Responsible Drilling Alliance, an all-volunteer, grassroots advocacy organization based in Williamsport.

Rebecca McNichol, CLEAR Coalition

Rebecca McNichol is the State Director of the CLEAR Coalition. Rebecca's professional background includes working on both state wide political campaigns as well as non-profit advocacy. Rebecca served as Senator Casey's statewide political director in 2005 and 2006. Rebecca has a master's degree from George Washington University and an undergraduate degree from Rutgers University.

Gabe Morgan, SEIU Local 32 BJ, Pittsburgh

Gabe Morgan is the President of the PA SEIU State Council which represents 75,000 workers in Pennsylvania and Pennsylvania Director of SEIU 32BJ, the largest property service workers local union in the world.

Roy Newsome Jr., AICP

Roy Newsome currently provides policy development and planning services as a volunteer to public agencies and nonprofit organizations. He retired in 1996 after 38 years of government service. He has held planning advisory and policy development positions in local and state agencies and with the federal government including Special Assistant to the Executive Director of the Pennsylvania Housing Finance Agency, Director of the Pennsylvania Governor's Policy Office, Special Assistant with the Federal Emergency Management Agency and Planning Advisor to the Secretary of the Pennsylvania Department of Community Affairs. He is associated with a number of nonprofit and/or public interest organizations and has appointments to several public boards. He is past president of Tri-County HDC, Inc. a regional housing development group, past president of the Housing Alliance of Pennsylvania, serves on the Dauphin County Affordable Housing Trust Fund Board and his local Township Planning Commission. He has a Masters of Regional Planning from the University of North Carolina and is a USMC veteran. He resides in Lower Paxton Township with Mary Grace, his wife of 53 years.

Rev. Ricky Phillips, Mazzeppa Lutheran Church/Dry Valley Lutheran Church, Buffalo Valley

Rev. Ricky Phillips is a Pastor in the Evangelical Lutheran Church of America and also holds ministry status in the United Church of Christ. He serves as the Pastor of Mazeppa Union Church in Lewisburg, Pa and St John's Church of Dry Valley in Winfield, Pa. He is the current Secretary for Lutheran Advocacy in Pennsylvania and is the Hospice Chaplain for Evangelical Hospital in Lewisburg. He also serves as a Yoke Fellow Prison volunteer in the Federal Bureau of Prisons at Lewisburg Penitentiary. He represented Pennsylvania as the Guest Chaplain for the United States Senate in March of 2010 where he was nominated by Senator Robert Casey Jr. He is the Upper Susquehanna Bishop's Representative to the Episcopal Church, and he represented North America in the Lutheran World Federation Luther Seminar in Wittenberg, Germany in October of 2010. He is also a member of the Pennsylvania Society.

James A. Schmid, Biogeographer

James A. Schmid is a biogeographer and plant ecologist with over 40 years of field experience in environmental impact assessments, wetland delineation, and regulatory consulting. He holds master's and doctoral degrees in geography from the University of Chicago and taught ecology and environmental science at the Department of Biological Sciences at Columbia University. Since 1980, he has headed his own consulting firm in Media, Pa. He has published numerous books, articles, and contract reports.

John Stolz, Duquesne University

John Stolz is a Professor of Biology in the Department of Biological Sciences and Director of the Center for Environmental Research and Education at Duquesne University. An environmental microbiologist, he studies the microbial metabolism of metals, including arsenic, selenium, and chromium. He is currently investigating the environmental impacts of shale gas extraction with emphasis on water issues. He has published 63 journal articles, 30 book chapters, and edited two books.

Mary Beth Sweeney, League of Women Voters of Pennsylvania

Mary Beth Sweeney serves on the State Board of the League of Women Voters as coordinator for natural resources with specific responsibilities for Marcellus Shale. She previously chaired the study committee of the Indiana League of Women Voters that was responsible for the development of the Marcellus Shale Natural Gas Study Guides and served on the committee that developed the addendum studies on Pipelines and Pooling. In 2007, she retired as coordinator of the Westmoreland County Community College Indiana Center and prior to that was the Adult Education Coordinator at Indiana County Technology Center. From 1983 to 2003, she was a member of the Indiana Area School Board of Directors, serving as President from 1993 to 2003.

Ritchie Tabachnick, Equipment & Controls Africa

Ritchie Tabachnick is President of Equipment & Controls Africa, a provider of engineered products and technology services to the energy industry in Western Africa. He was one of the founders of the business in Africa in 1996, and has served as its president since 2004. He has a total of 35 years of experience in energy, technology, manufacturing and consulting businesses. He holds B. Eng. and M. Eng. degrees from McGill University. He is also a member of the board of Keystone Progress, one of the Citizens Marcellus Shale Commission's supporting organizations.

John Anthony Trallo, Residents United for Pennsylvania/Sullivan County Chapter

John Anthony Trallo is the chairman of Residents United for Pennsylvania/Sullivan County Chapter (RU4PA). He has been involved in hosted public forums and lobbying events and has addressed the Governor's Marcellus Shale Commission. He also organized and moderated the "Cumulative Environmental Effects of Gas Drilling" event at the Sullivan County High School in Laporte, with presentations by Dr. Anthony Ingraffea of Cornell University and Dr. Terry Engelder of Penn State University. He is a member of the Responsible Drilling Alliance, the Damascus Citizens for Sustainability, the Loyal Order of the Moose, the American Legion Post 601, and MusiCares, an organization dedicated to providing emergency disaster relief. He is a professional musician/music teacher/luthier/write (http://www.johntrallo.com) and blogs about property rights at http://pacitizensane.blogspot.com/. He lives in Sonestown, Sullivan County.

Roberta Winters, League of Women Voters of Pennsylvania

Roberta Winters serves on the State Board of the League of Women Voters of Pennsylvania as the Vice President for Issues and Action. Previously, she coordinated the Marcellus Shale Natural Gas Extraction Study Guides and chaired the recently completed addendum studies on Pipelines and Pooling. In 2006, Roberta retired from her elementary school teaching position in the Radnor Township School District. Her educational background includes a B.S. degree in biology from Bucknell University, an M.A.T. in science education from Harvard University, and an Ed.D. in educational leadership from the University of Pennsylvania.

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